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LETTER DATED 26 APRIL 1991 FROM THE SECRETARY-GENERAL
ADDRESSED TO THE PRESIDENT OF THE SECURITY COUNCIL

In my letter of 1 March 1991 to the President of the Security Council (S/22333), I brought to his attention a letter I had received from the Permanent Representative of Kuwait requesting that a mission be dispatched immediately to that country to assess the losses of life incurred during the Iraqi occupation of Kuwait and to examine the practices by the Iraqi occupation forces against the civilian population in Kuwait. He had also requested that the team assess the damage inflicted on the general infrastructure in Kuwait.

In his letter of 6 March 1991 (S/22334), the President of the Security Council informed me that members of the Council would welcome my responding positively to that request, recognizing the importance of taking all actions possible to facilitate Kuwait's reconstruction and reintegration into the international economic system.

Accordingly, I requested Mr. Abdulrahim A. Farah, former Under-Secretary-General, to lead a high-level United Nations mission to Kuwait. The mission visited that country from 16 March to 4 April 1991. The report of the mission on the damage sustained by the infrastructure and economy of Kuwait during the Iraqi occupation is submitted herewith for the attention of members of the Security Council.

(Signed) Javier PEREZ de CUELLAR

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Annex

REPORT TO THE SECRETARY-GENERAL BY A UNITED NATIONS MISSION, LED BY MR. ABDULRAHIM A. FARAH, FORMER UNDER-SECRETARY-GENERAL, ASSESSING THE SCOPE AND NATURE OF DAMAGE INFLICTED ON KUWAIT'S INFRASTRUCTURE DURING THE IRAQI OCCUPATION OF THE COUNTRY FROM 2 AUGUST 1990 TO 27 FEBRUARY 1991

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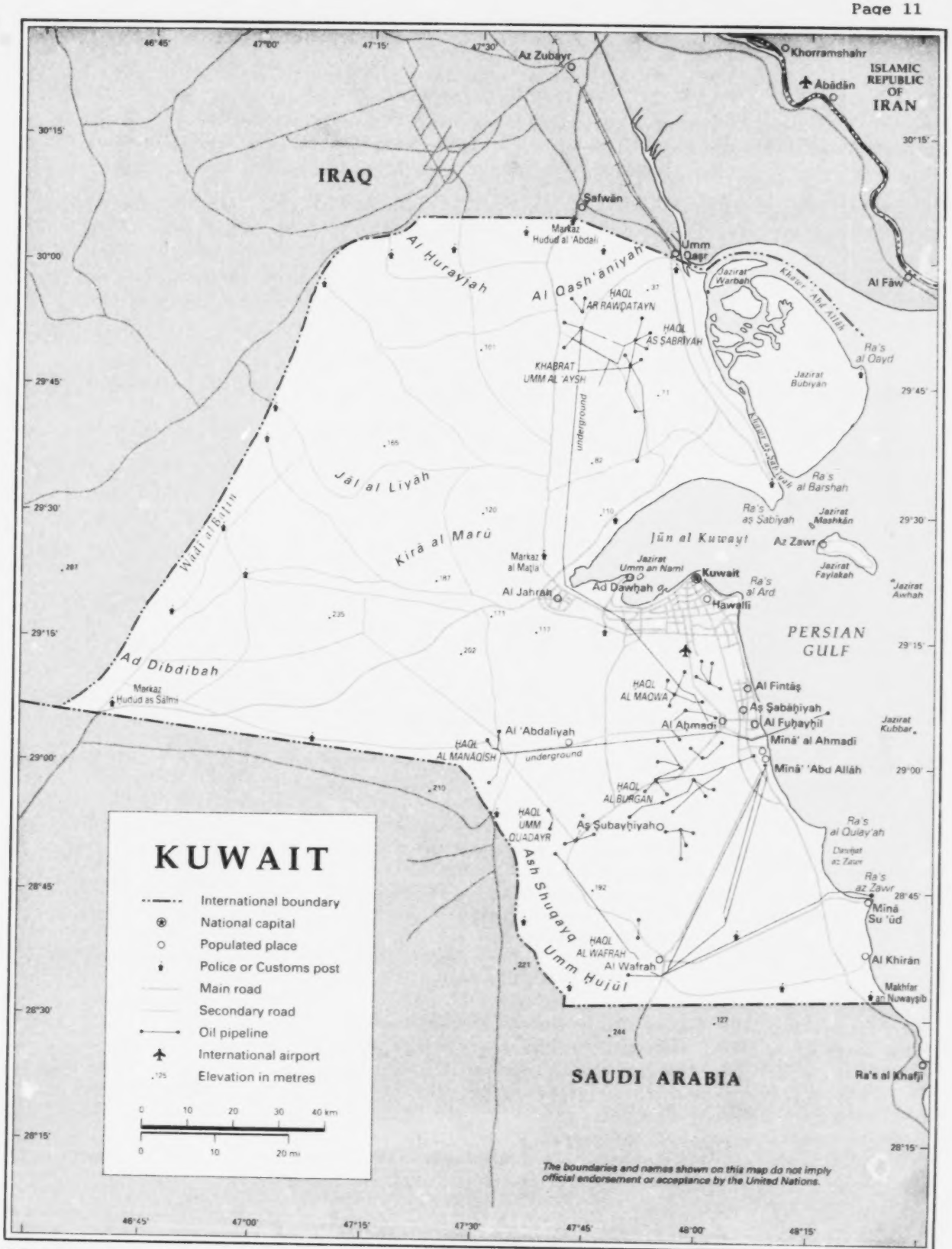

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JANUARY 1991

INTRODUCTION

A. Mandate and composition of the mission

1. On 6 March 1991, the Secretary-General decided to dispatch a United Nations mission to Kuwait with the following terms of reference:

(a) To receive pertinent information from the Kuwaiti authorities, as well as non-governmental organizations (NGOs), for an assessment of the losses in life incurred during the Iraqi occupation of Kuwait;

(b) To receive pertinent information from the Kuwaiti authorities, as well as NGOs, on Iraqi practices against the civilian population in Kuwait;

(c) To assess the scope and nature of the damage that was inflicted on Kuwait's infrastructure during the period.

2. The present report is confined to the assessment of the damage to the infrastructure. The information called for in parts (a) and (b) of the terms of reference are the subject of a separate report (S/22536).

3. In his instructions to the leader of the mission, Mr. Abdulrahim Abby Farah, the Secretary-General emphasized the necessity of the mission proceeding without delay and, given the situation prevailing in Kuwait, that its report be completed as soon as possible.

4. Before leaving for Kuwait, Mr. Farah met in New York with the Acting Permanent Representative of Kuwait to the United Nations, Mr. Mohammad Saad Al-Sallal, and was provided with information that would enable the mission to identify specifically the areas and sectors on which the Government of Kuwait wished the mission to focus attention.

5. Sectoral work was assigned among the substantive members of the mission as follows: Mr. Cristian Ossa (Department of International Economic and Social Affairs of the United Nations Secretariat), macroeconomics; Mr. Michael Douglas Gwynne and Mr. Makram Gerges (United Nations Environment Programme (UNEP)), environment, agriculture and fisheries; Mr. John Beynon (United Nations Educational, Scientific and Cultural Organization (UNESCO)), education, culture and information; Dr. Daniel Tarantola (World Health Organization (WHO)), health; Mr. G. H. Connor (Department of Technical Cooperation for Development of the Secretariat), transport and municipal services; Mr. Ola Gunnes (Department of Technical Cooperation for Development), power and telecommunications; Mr. Kamal Mohamed Abou-Hamda, consultant for housing and urban infrastructure; and Mr. John Philip Thomas, consultant for oil industry, assisted by Mr. Johan Schölvinck (Department of International Economic and Social Affairs). Mr. Ramu Damodaran of the United Nations Secretariat served as Secretary of the mission. In view of the abnormal conditions in Kuwait and the absence of any United Nations back-up presence there, it was necessary for the mission to be assisted by a self-contained staff.

6. Members of the mission based in New York convened on 7, 8 and 11 March for preliminary consultations. In accordance with a programme drawn up in consultation with the Government of Kuwait, the main party reached Bahrain on 13 March, where they were joined by colleagues based elsewhere.

7. Logistical constraints made it necessary for the mission to spend two days in Bahrain before it could proceed to Kuwait. Fortunately, this provided an opportunity for senior members of the mission to be received by His Highness, the Prime Minister of Bahrain, Sheikh Khalifa Bin-Salman Al-Khalifa. Meetings were also held with His Excellency, the Foreign Minister of Bahrain, Sheikh Mohamed Bin-Mubarak, and the Minister for Information, Mr. Tarek Al-Moayyed. Discussions centred on the situation in Kuwait, its impact on the Gulf region and the role of the United Nations. The Government of Bahrain expressed its strong support for Kuwait and its determination to provide that country all possible assistance in the task of national reconstruction.

8. The mission reached Kuwait on 16 March by a special aircraft provided by the Government of Kuwait. It was received at the airport by His Excellency, Mr. Nasser Mohammed Al-Sabah, the Minister of State for Foreign Affairs of Kuwait, and other senior government officials. The same afternoon, the mission discussed its work programme with Mr. Abdullah Al-Dikheel, former Minister for Public Works of Kuwait, who had been designated by the Government as Mr. Farah's counterpart.

9. On 20 March, Mr. Farah was received by His Highness, Sheikh Saad Al-Sabah, Crown Prince and Prime Minister of Kuwait. The Crown Prince expressed his country's deep appreciation to the Secretary-General for his prompt response to its request that a mission be dispatched to look into the question of damage sustained by Kuwait during the country's occupation by Iraq.

10. The mission completed its work in Kuwait on 4 April 1991.

B. General setting

11. The mission's mandate made clear that it should confine its study and assessment to the situation that prevailed in Kuwait during the period of occupation, that is, from 2 August 1990 to 26 February 1991. The complexity of the task confronting the members of the mission became apparent once it had the opportunity to witness for itself the realities on the ground and the abnormal conditions that had been created as a result of the occupation.

12. Before 2 August 1990, Kuwait was a society characterized by a highly capitalized, urban infrastructure. The mission arrived in Kuwait just two weeks after the return of the Government. It found itself obliged to begin its task in a country where the electric power, telecommunications and transportation systems had been wrecked, government buildings and other public institutions heavily damaged and most official records and equipment either

destroyed or looted. Moreover, very few civil servants had resumed duty, and the vast majority were still outside the country.

13. Despite its acute shortage of senior and experienced staff, the Government did manage, in most cases, to assign counterparts to work with members of the mission in their respective areas of competence. This was particularly considerate since the stay of the mission occurred at a time when the Government was intensely occupied in restoring the administrative machinery and attending to the immediate needs of the people. Because of the staff situation, government counterparts were often called upon to fulfil other tasks while doing their best to assist the mission.

14. Members of the mission travelled extensively throughout the country, by land and by helicopter, making frequent and detailed visits to particular locations, sites and institutions essential to their task. The constraints of time and limitation of facilities necessitated the adoption of sample surveys in all sectors. The mission did not assess the damage sustained by defence infrastructure although it did observe damage to military airfields, barracks and defence installations.

15. Extensive contacts were maintained with members of the diplomatic community in Kuwait, with whom Mr. Farah held two meetings through the courtesy of the Ministry of Foreign Affairs of Kuwait. He also had talks with a number of ambassadors individually.

16. The mission wishes to record its appreciation of the contribution of a number of national and international agencies and groups who provided logistical support, as well as access to data, records and maps. In particular, it should like to mention the Embassies of France, the United Kingdom of Great Britain and Northern Ireland and the United States of America, as well as the Corps of Engineers and the 352nd Civil Affairs Command of the United States Army, the Explosives Ordnance Disposal Coordination Group of the coalition forces, the Environmental Protection Agency of the United States and the Kuwait Petroleum Corporation. Interaction between the mission and these, and other, organizations facilitated a sharing of assessments and ideas and an exchange of expertise, as well as cross-checking and verification of information obtained.

C. Methodology

17. Its terms of reference required the mission "to assess the scope and nature of the damage that was inflicted on Kuwait's infrastructure during the period". Since "infrastructure" has a broad meaning, the mission's assessment at the sectoral level has focused on three interrelated elements:

(a) Permanent structures such as roads, ports, hospitals, educational institutions, factories, water plants and government and residential buildings;

(b) Machinery, equipment and other support facilities, including stock, that enabled the structures to perform the functions for which they were designed;

(c) Materials and software (e.g., books, archives, historical artifacts, research data) that were integral to the effective functioning of the service or activity of which they were a part.

18. The report comments on, and attempts to provide, a broad assessment of the impact of events during the Iraqi occupation on the welfare of the population of Kuwait, in particular on the social sectors, as well as on the air and marine environment and terrestrial ecosystems.

19. In the light of its initial findings, the mission also felt it necessary to comment on the extensive loss of output after 2 August 1990 as a result of the damage to the economy during the occupation, and on the nature and scale of the loss of goods, equipment and materials deriving from the deliberate destruction and organized looting and removal of property.

20. The mission was shown numerous sites where moveable property had been removed. According to testimony it received, such removal had been carried out by the Iraqi occupation authorities or on their specific order. Some instances reported to the mission appeared to be prima facie cases of looting, pillaging or plundering and these have so been described in the text. In other cases, property was not physically taken away but simply destroyed on site. In still other instances there is clear evidence of vandalism and ransacking. Accounts given to the mission during its survey attributed responsibility to the occupation forces in all such cases. It was also explained to the mission that during the occupation a number of areas had been declared off-limits to Kuwaiti residents, thus facilitating the removal of goods without their knowledge.

21. While the seizure of some moveable property - particularly from warehouses, factories and plants - appeared premeditated and planned, at the shop or household level the pillaging of goods was said to have been carried out by individual Iraqi soldiers. In a number of cases the Iraqi authorities issued receipts to some institutions and factories from which goods had been taken, and even vouchers to be redeemed subsequently in Iraqi currency.

22. In reading the present report it should be understood that references to the removal of goods, in whatever manner, are intended to mean that they were removed by the Iraqi occupation forces either for their use in Kuwait or for transportation to Iraq.

23. Given the urgent and hence limited time-frame for the mission's work in Kuwait and the very difficult circumstances under which the assessment had to be undertaken, the mission decided to concentrate on the main sectors having a major bearing on Kuwait's economic activity - the oil industry, for example - or on those sectors that substantially affect the welfare of the population, such as health and the environment. The mission also examined the

petrochemical and other manufacturing industries, electricity and water, agriculture, livestock and fisheries, sewerage and waste disposal, transport and communications, education and culture, housing and urban infrastructure, banking and commerce, as well as information and other services.

24. The mission established certain guidelines to achieve a uniform approach in all sectors. The approach involved the following steps:

(a) An appraisal of the conditions of each sector before 2 August 1990, together with an identification of the central or core elements in each sector;

(b) Preliminary discussions between the sectoral leaders of the mission and their Kuwaiti counterparts on current conditions in each sector and, in particular, possible damage inflicted on core elements during the period of occupation;

(c) On-site inspection by the sectoral leaders of core elements and of other areas heavily affected, as well as an assessment of loss and damage to the infrastructure, machinery, equipment, support facilities, materials, etc.;

(d) Cross-checking of information with government officials, national and international agencies, technical experts, in particular from the multinational forces (e.g., mine-clearing experts and United States Army Corps of Engineers), and, in relevant cases, executives from the Kuwaiti private sector;

(e) On-site inspection of secondary elements (e.g., electrical substations, local health clinics) and geographical areas moderately damaged or undamaged. This was done on a selective basis, endeavouring to ensure adequate representativity. In a few cases, this was supplemented by a catalogue or inventory from the Kuwaiti authorities;

(f) Discussions with the Kuwaiti authorities, sectoral representatives and other experts in the area to ascertain possible gaps in the assessment of damage and on-site inspection of gaps so identified.

25. Since the mission was not intended to provide, and indeed was not in a position to suggest, an exhaustive, quantified evaluation of damage, the sectoral assessment involves only a characterization of the damage and an indication of its extent. The latter is assessed, wherever possible, in percentage terms. For most estimates, the margin of error is plus or minus 10 per cent.

26. Particular difficulties arose in making accurate assessments of the current inventory of raw materials, spare parts, finished goods and equipment, as well as of intellectual and cultural property (books, archives, historical artifacts, research data, notes and texts) in the various institutions and facilities visited.

27. Since most files were destroyed or removed, it will be particularly difficult for the public and private sectors to reconstitute the lists of their inventory at the time of the invasion. Similarly, it will be some time before exact lists can be established of assets that remained after the withdrawal of the occupation forces, since few, if any institutions or factories show any semblance of normal functioning. Many facilities are wholly deserted and in those cases where some staff have reported for work, they are primarily engaged in the most basic tasks of restoring a semblance of order by sifting through the few remaining documents.

28. The mission visited many premises, inspecting storage rooms and warehouses of each institution in order to verify conditions at the time of its visit. The mission's awareness of the inventory normally required for the proper functioning of the various facilities helped it to gain a good idea of the extent of the losses. It should be borne in mind that Kuwaiti institutions, because of the relatively generous availability of resources, were often in a position to keep large stocks of supplies in hand.

29. Four categories were used to quantify damage or loss of assets: (a) less than 20 per cent, slight damage or slight loss; (b) 20 to 50 per cent, moderate damage or moderate loss; (c) 50 to 80 per cent, heavy damage or heavy loss; and (d) 80 to 100 per cent, completely damaged, total destruction or total loss. The corresponding categories used in the environmental assessment were: light; moderate; severe; very severe. In the case of major infrastructure items, a brief description of the damage to each item has also been included in the text.

30. In surveying the damage to the infrastructure in Kuwait, the mission took into account the fact that some areas, sites and locations in the country had been the scene of armed conflict and engagement, while others had been the target of military action by one side or the other. This was particularly the case with airfields and telecommunication installations. However, the overwhelming majority of sites visited and inspected by the mission suggested damage that was not war-related but the result of wanton and deliberate acts, some intended to destroy specific national assets and vital services.

31. The basic approach to the assessment of the environment was essentially the same as in other sectors. None the less, it is important to highlight its special features. First, it was broad-based, covering all the geography of the country, including coastal areas and environment-related sectors, such as agriculture, livestock and fisheries. Secondly, environmental conditions were still changing rapidly, with further deterioration in some areas and improvement in others. Thus, the mission tried to collect all data on environmental conditions compiled from different sources since the withdrawal of the occupation forces, including data and measurements that were becoming available on an almost daily basis while the mission was in Kuwait.

I. ECONOMIC AND SOCIAL CONDITIONS IN MID-1990 AND EARLY MARCH 1991

A. Situation before 2 August 1990

32. In mid-1990, the population of Kuwait was 2.1 million, of whom about 800,000 were Kuwaiti citizens. More than half of the population was under 25 years of age. Well over 90 per cent of the total population lived in urban areas along the coast, giving the whole country a metropolitan character. Life expectancy for men was 71 and for women 75 years, with an infant mortality rate of the order of 15 per 1,000. Kuwaiti citizens enjoyed a developed welfare system backed by a well-equipped infrastructure.

33. Education, including secondary education, was provided free to both Kuwaitis and non-Kuwaitis. Health services were also virtually free and of quite a high standard, as was housing, which was heavily subsidized for the low- and middle-income groups of the population.

34. Per capita income amounted to about $US 14,700, while the per capita gross domestic product (GDP) amounted to $11,600 in 1989. The difference was due to large revenues in the form of interest and dividends from accumulated investments abroad. Crude oil production and related activities made up for a large part of total output: 40 to 50 per cent of GDP.

35. The economy had remained fairly vulnerable to oil prices in international markets, since petroleum and petroleum products accounted for 90 per cent of total exports. It had, however, continued to expand, albeit modestly, in the 1980s. The rate of inflation during this period was remarkably low.

36. A cautious balance-of-payments policy and a very large export sector ensured a steady surplus in the balance on current account, leading to increased investments abroad and a strong dinar. Between 1985 and 1989, average annual exports of goods and services amounted to $8,800 million and imports to $4,670 million. According to International Monetary Fund (IMF) figures at the end of June 1990, the level of total reserves minus gold had reached $2,128 million and gold reserves stood at 2.5 million fine troy ounces.

37. The share of gross fixed capital formation in GDP, a major determinant of the potential for economic growth, could be compared to that of States members of the Organization for Economic Cooperation and Development (OECD): slightly below 20 per cent in the late 1980s. The investment level in 1989 was close to $5 billion. Government policies and the comparatively high investment rates led to a gradual diversification of the economy, despite the enormous potential of the oil industry. Indeed, the country's proven recoverable oil resources were quite high in mid-1990. They had been estimated at 94,500 million barrels, which measured the equivalent of about 200 years of output at a rate of 1.3 million barrels a day.

38. The steady stream of oil export revenues allowed the country not only to attain a high level of material prosperity, but also to channel a large volume

of resources through the public budget. In the 1988/89 budget, expenditures reached $11 billion, mainly for industrial diversification, the increased provision of social services and the gradual establishment of a major reserve fund for future generations, as well as aid to low-income developing countries. In fact, in relation to its GDP, Kuwait was among the international community's largest aid donors in the 1980s.

39. In the late 1980s, annual per capita public expenditure in education and health was about $500 and $350 respectively. The number of university graduates was growing at a rate exceeding 8 per cent a year - twice the rate of growth of the population. The number of graduates in petroleum, engineering, medicine and allied health services was growing at an even more rapid pace.

40. In brief, Kuwait, in mid-1990, had a solid balance-of-payments position, public finances were under control and the process of industrialization and improved development of human resources was proceeding apace. Economic instability was still somewhat inherent in the development process of the country because of the volatility of oil prices and the unusually high reliance on migrant labour. However, Kuwait had a functioning economy and was clearly poised to attain even higher living standards and still greater social development in the years ahead.

B. Conditions in March 1991

41. The invasion of Kuwait in August 1990 brought about a dramatic change. By the end of Iraq's occupation on 26 February 1991, the outlook had been radically transformed. Kuwait City, previously a modern, urban centre with thriving bazaars and a busy commercial district, had become a ghost town. The same was true of other urban areas across the country, where major social dislocations had occurred during the occupation of the country: two thirds of Kuwaiti nationals had sought refuge abroad; three quarters of the labour force had been obliged to leave Kuwait; and the quality and availability of health services had been dramatically downgraded and education had come to a halt.

42. The effect of the occupation on Kuwait's economic and commercial life was even more devastating. Managerial capacity to run corporate activities and carry out government tasks had been depleted. The occupation authorities, through a web of administrative and financial restrictions, had prevented the few executives who had remained in Kuwait from taking any initiative.

43. The physical infrastructure supporting basic services - electricity, water, waste disposal - had been rendered inoperative; ports largely destroyed; oil production and refining and related offloading activities crippled; the financial system severely disrupted; foreign trade suspended; commerce considerably diminished; manufacturing paralysed; and inventories plundered. The marine environment had been severely affected by the flow of crude oil into the Persian Gulf, while the beautiful waterfront in Kuwait City had been devastated and its entire beach turned into a minefield.

44. From an economic point of view, no less than from an environmental perspective, the greatest damage was that inflicted on the oil industry. The destruction of refineries and pipeline and storage systems and, above all, the firing of more than 600 oil wells had brought unprecedented catastrophe to the economy and the environment of Kuwait. Moreover, numerous mines laid by the occupation forces continued to pose a persistent threat to human lives.

45. At the time of the arrival of the mission in mid-March 1991, economic, social and environmental conditions bore no resemblance to the situation that prevailed only eight months earlier.

46. The fall in aggregate output and the losses of income were staggering. The decrease in Kuwait's GDP between early August 1990 and late February 1991 was more than 70 per cent. Capital formation came to a halt as virtually all new projects, and projects under implementation, were stopped.

47. Even an enormous drop in output and investment paralysis can be a transitory phenomenon. In Kuwait, however, the widespread destruction of capital assets and the supporting infrastructure, as well as the looting of equipment and inventories, could only make recovery difficult and protracted. Output losses remained quite substantial in March and will continue to be very large in the coming months.

48. Despite the unprecedented economic setback and social dislocation, the mission witnessed some significant improvements during the short period it was in Kuwait. Electric power and telephone services had been restored to parts of the country and food and other essential goods were becoming increasingly available. A few retail shops that had escaped damage had been opened and street vendors had appeared. But the essential process of repair and rehabilitation was still very much at its initial stage. Succeeding generations will continue to be endangered by unexploded ordnance, particularly mines. The physical infrastructure could well require a great part of the present decade to recover. The harm to the population from a polluted environment, although not easily identifiable today, may become manifest in a pervasive way only with the passage of time. Plans for the restoration of social and administrative services are being formulated on an urgent basis. But it will take months, even years, before the country recovers from the damage and losses inflicted by the Iraqi occupation.

II. SUMMARIZED ASSESSMENT OF MAJOR DAMAGE

49. As explained in the introduction to the present report, the mission carried out a very broad assessment of the damage inflicted on the economy of Kuwait as the result of the country's occupation by Iraq.

50. Based upon data presented by the Kuwaiti authorities, as well as on estimates made by expert members of the mission, it was possible to arrive at a very broad approximation of damage and loss sustained in several areas. A summary quantification is presented below.

51. The GDP of Kuwait was of the order of $24 billion in 1989. The invasion led to a virtual paralysis in many economic activities and a major reduction in the delivery of service. The corresponding loss in output, and consequently income, amounted to about $10 billion between August 1990 and February 1991.

52. The rehabilitation of the oil industry, including the capping and control of oil wells, the repair of gathering centres and the reconstruction of refineries is expected to exceed $5 billion. In addition, nearly 4 million barrels were being lost daily at the time of the mission's visit. This loss will accumulate until the wells are controlled and capped.

53. Critical parts of the electrical generating capacity and also part of the distribution grid were destroyed during the occupation. The cost of restoring the electrical system to the standard prevailing before the invasion will be of the order of $1 billion.

54. The damage suffered by the transport infrastructure was heavy in the case of ports and harbours. The national airport also suffered major damage. Air transport services not only sustained damage to their facilities they also experienced a major theft in equipment. The overall losses sustained by ports, the airport and the national airline amount to more than $2 billion.

55. The country's road transport fleet, including private and public vehicles, needs to be restored to its former level. The occupation resulted in at least half of the country's transport fleet (buses, long-haul vehicles, tankers, trucks, cars, etc.) being lost, either by their appropriation and removal from the country or by destruction. Restoring the fleet to its former level of 560,000 vehicles is estimated to cost over $5 billion.

56. The country's satellite system and the internal telephone and telecommunications network will need a considerable amount of replacement equipment and will take some time to repair. It is estimated that $1 billion will be required to bring these essential services back into full operation.

57. In the case of radio, television and press services, another $500 million will be required to rebuild damaged transmitter stations, to replace the powerful transmitters that were either removed or destroyed and to re-equip studios, control rooms and printing establishments.

58. It is difficult to estimate the cost to the housing sector since the losses were not so much the result of structural damage as of ransacking and vandalism that were inflicted on a great number of houses, particularly those that were unoccupied during the seven-month period. At a conservative average figure of $15,000 per dwelling unit, it is estimated that total losses to 170,000 housing units will be approximately $2.5 billion.

59. The reconstruction and refurbishing of 800 rooms in damaged deluxe and first-class hotels will exceed $500 million. The group of hotel owners contacted has made an estimate of $100,000 per room, which includes the restoration of restaurant and catering areas, equipment and all other facilities.

60. To rebuild, repair and refurbish other urban infrastructure, major expenditures will need to be incurred. To restore government buildings, including the National Assembly, and to repair the waterfront, reconstruct the International Trade Fair and rehabilitate the sporting clubs and other recreational facilities, at least another $500 million will be required.

61. In the banking sector, Kuwait will need to recover valuables taken from a very large number of commercial banks. Moreover, 1.3 million troy ounces of gold valued at close to $500 million were removed from the Central Bank.

62. The looting of wholesale and retail establishments was massive and spared virtually no commercial centre, warehouse or large store. Estimates in this area can only be very tentative, yet losses (excluding vehicles) could easily approach $1 billion.

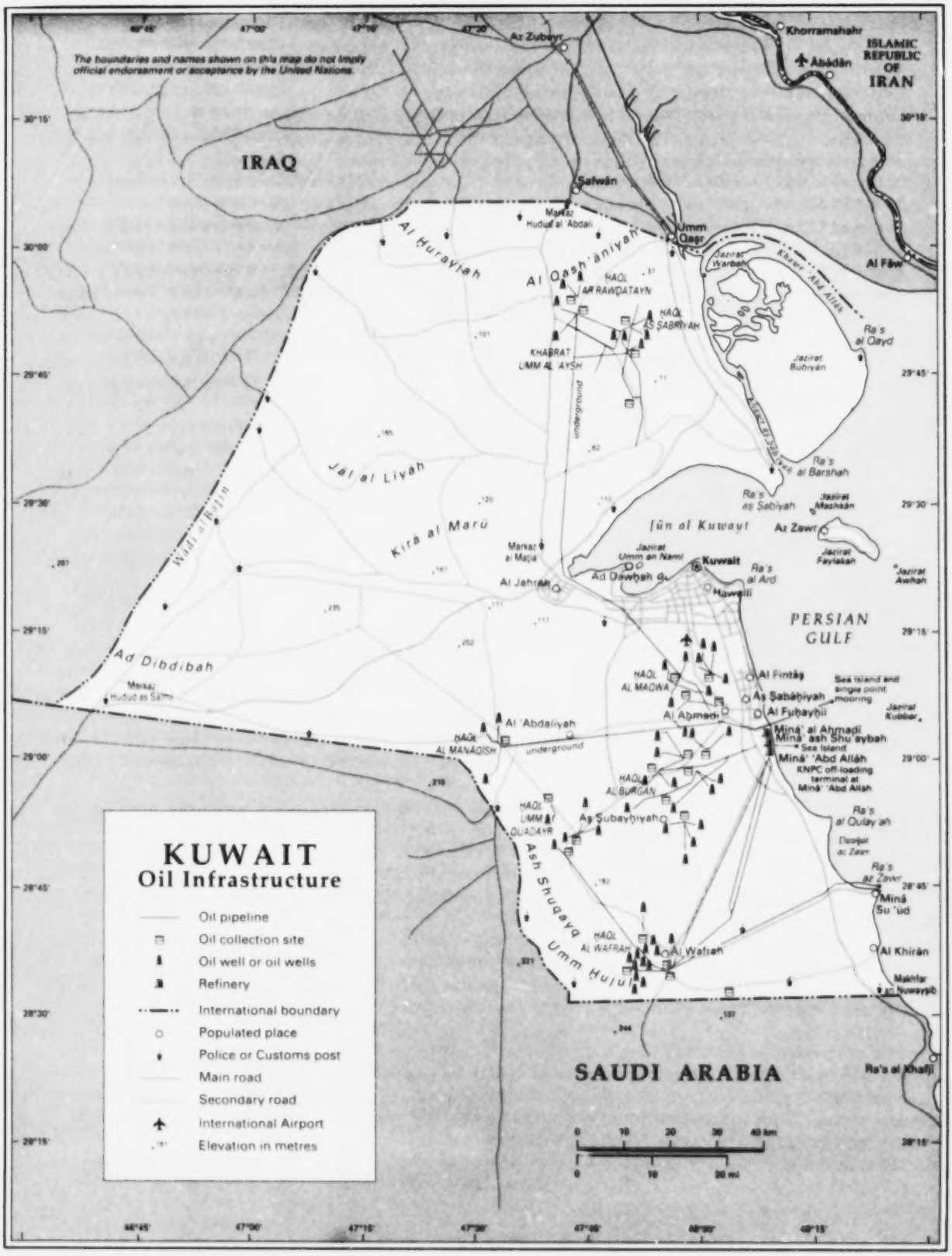
63. The damage to the petrochemical industry and other manufacturing activities was large and often characterized by the complete removal of modern machinery and equipment and the looting of inventories (raw materials, spare parts and finished products). Owing to the very large number of affected industrial establishments, an accurate quantification will take considerable time. However, an amount of damage bordering on $1 billion appears reasonable.

64. The above estimates do not cover all damage sustained. Destruction of installations and considerable losses of equipment were sustained in other sectors, in particular education and health, as well as the road network and maintenance equipment, water supply and garbage disposal systems, agricultural stations and fisheries.

65. Moreover, in a number of areas surveyed by the mission there was damage or "hidden losses" whose precise scale and nature were not evident on the surface but which, nevertheless, might represent a further erosion of Kuwait's infrastructural base. These include damage resulting from inadequate care and maintenance, the rusting and disintegration of metal components, the solidification of liquids or extraneous materials obstructing or blocking pipes and ducts in refineries, industrial plants and public utilities. Among the most important of the unassessed losses is the damage to the oil reservoirs. None of these could be assessed at the time of the mission's visit.

66. Related to this is the continuous loss in output, and consequently of income. In March 1991, the economy remained at a standstill. To return to production levels prevailing in early 1990, let alone to surpass them, would require enormous investments not only of money but also of manpower.

67. Finally, but by no means the least important, is the range of unquantifiable losses arising from the down-grading of health facilities, the depletion of the national cultural heritage, the irreplaceable school year lost to all students and, of course, the degradation of the environment. Not one of these can even remotely be assessed in finite figures but their impact will be felt by Kuwait for generations to come.



MAP NO. 3631.1 UNITED NATIONS
APRIL 1991

III. OIL INDUSTRY

A. An overall view

68. Kuwait's petroleum industry (see map 2) was a fully vertically integrated operation covering all facets of exploration, drilling, production, refining and marketing, both domestically and internationally.

69. During the occupation of Kuwait, much of the country's petroleum industry was pillaged and sabotaged. The latter is perhaps most graphically evidenced by the hundreds of fires that were set off by the blowing up of the oil wells.

70. The mission's assessment of the damage takes into account not only the degree of destruction but also the interdependence and interrelationship of each separate and distinct function of the petroleum industry. In order to facilitate the understanding of the nature of its vertical integration, two block flow schematics are reproduced at the end of the present section. Figure 1 depicts the petroleum production network and figure 2 shows the gas production network.

B. Crude oil production facilities

1. Situation before 2 August 1990

71. At the beginning of 1990, Kuwait's oil wells had an installed capacity of 2.9 million barrels per day with maximum technically sustainable capacity of 2.5 million barrels per day. According to some estimates, this latter figure could have been increased to 4 million barrels per day within 24 to 36 months. Proven reserves stood at 94,525 million barrels by the end of the 1980s (or about 130 years of production at a rate of 2 million barrels per day).

72. At the time of the invasion, crude oil production in Kuwait amounted to about 1.5 million barrels per day. Crude oil production and associated offloading facilities were carried out by the Kuwait Oil Company (KOC), a subsidiary of the Kuwait Petroleum Corporation (KPC).

73. There are four areas in Kuwait that are in use for producing crude oil: north Kuwait, west Kuwait, south-east Kuwait and Wafrah. The first three areas are wholly owned and operated by KOC, while the crude oil production in the Wafrah area was shared equally by Kuwait and Saudi Arabia.

74. North Kuwait consisted of four fields with 316 wells and produced 400,000 barrels per day. West Kuwait contained three fields with 134 wells and produced 150,000 barrels per day. South-east Kuwait was the "jewel in the crown" of Kuwait's oil production and contained the multi-reservoir Greater Burgan field, the second-largest oilfield in the world. There were 661 wells in south-east Kuwait and it produced 1.1 million barrels per day. Of the total of 1,111 wells in these three areas, 980 were in production on

1 August 1990. Of the 900 wells in the Wafrah area, 350 were active and produced between 170,000 and 180,000 barrels per day. Half of Wafrah's production was transported through underground pipelines to a refinery at Mina Az Zawr, which is owned and operated by Texaco for the benefit of Saudi Arabia. Part of the other half (heavy crude or eocene) went by underground pipelines to the refinery at Mina Abd Allah, but was processed at the Al Ahmadi refinery. The rest was normally stored in tanks at Ahmadi town.

75. Wafrah differs from the other three areas in that there was very little pressure in its fields and in many instances oil was pumped out by means of suckerrod pumps. As a result of the pressure in the other three fields, oil and the associated natural gas flowed freely through surface gathering lines to gathering stations for processing.

76. After separating the oil and gas, the oil was conveyed by underground pipelines and manifolds to two storage tank farms at Ahmadi, which had a combined storage capacity of 14 million barrels. The tank farms are located 120 metres above sea-level, which made it possible for the oil to flow by natural gravity through an intricate system of manifolds and underground pipelines to Kuwait's three refineries at Mina al Ahmadi, Mina Abd Allah and Mina Shuaiba as well as to its crude offloading facilities at Mina al Ahmadi and, through marine pipelines, to an offshore sea-island and a single point mooring facility.

77. On 1 August 1990, KOC was operating a modern, sophisticated crude oil production system requiring highly developed managerial and engineering skills and employing some 5,000 people. Its crude oil exports alone (excluding export of refined products) generated about $13 million per day for the Kuwaiti economy.

2. Assessment of damage

78. After almost seven months of occupation, this prosperous situation dramatically changed. Kuwait's oil industry was reduced to a shambles. Excluding the Wafrah area, there were 980 active crude oil and associated natural gas producing wells. Of these, some 550 were in flames. Many other wells, which were not on fire, were gushing tens of thousands of barrels of oil each day, flooding the desert and creating lakes and rivers of oil. If one takes into account the Wafrah area, the total number of active wells increases to 1,330, of which approximately 700 were on fire at the time of the mission's visit.

79. Estimates vary, but there is general agreement that from 2 million to 6 million barrels are lost in this manner each day. On the basis of $20 per barrel, this represents a loss ranging from $40 million to as much as $120 million each day. As a result of the occupation and the consequent loss of production during the period, Kuwait suffered an additional loss of $8.5 billion.

80. Today, no production of crude oil is possible, and it may take as much as 12 to 18 months to bring all the burning and gushing wells under control. Efforts to extinguish the fires have been initiated. These efforts are being helped by four undamaged underground pipelines leading from the tank farms to the Persian Gulf, which can be used to pump sea water to the oil fields in a reverse flow mode. This process will save considerable time, money and effort. As soon as the reverse flow pumping system is in place the fire fighting effort can start.

81. Since the end of March, three fire-fighting teams have arrived in Kuwait. By the end of May, 15 to 18 teams are expected to be in place. The operation would cost approximately $45 million to $50 million per month. Consequently, bringing all wells under control is estimated to range from $600 million to $850 million, or about $1 million to $1.5 million per well.

82. It is extremely difficult to establish the exact number of wells damaged as a number of areas have not been declared safe to enter because of mines and ordnance. However, taking the situation in the Maqwa and Al Ahmadi fields (both surveyed by the mission by helicopter and located in the Greater Burgan field) as a guide, only 5 out of 239 wells were free of damage. In addition, as the fires continue to rage out of control, major damage may be inflicted on the reservoirs. A number of wells are already yielding water mixed with oil and gas, turning the smoke from black soot to a grey mixture of soot and steam. Wells undergoing this process may be rendered useless for future production and the drilling of replacement wells, expensive remedial drilling techniques or other types of rehabilitation may be required to recover the oil. Furthermore, pressure in the reservoirs is also diminishing, thereby lessening considerably the ease by which the oil is currently produced.

83. In order to determine the extent of the damage to the reservoirs, simulation models must be developed. Fortunately such models have been made in the past for all KOC oil fields. It appears that they can be readily adapted for analysing the present production problems that may exist at the wells. In the event of wells having to be replaced because of irreparable damage, the average cost of completely restoring a shallow well (3,400-9,000 feet) would amount to up to $1.5 million and for a deeper well (9,000-15,000 feet) up to $5 million. Most of the wells in the Greater Burgan and Wafrah fields are shallow, ranging in depth from 3,400 to 4,700 feet, while in the northern and western fields they range from 7,500 to 11,000 feet.

84. At the same time there are 681 wells (550 in the Wafrah area and 131 in the other three areas) and gathering stations that are basically intact and could be brought on stream rather quickly, thus making it possible to produce as much as 50,000 barrels per day within two months and as much as 150,000 barrels per day within six months. These production rates are contingent upon the removal of other bottlenecks downstream from the wells but they are, of course, well below those prevailing before the occupation.

85. The upstream facilities of KOC, consisting of 26 gathering stations (excluding 1 main station and 23 substations at Wafrah), which separate the oil and gas at the well areas, were heavily damaged or destroyed. Of the 26 stations, which cost about $200 million each, the condition of only half could be ascertained since smoke, fire, mines and ordnance precluded visits on foot or surveys by helicopter. Eight of the 13 stations surveyed were severely damaged; 1 of these, located near the crest of the Greater Burgan field, where the smoke and fire conditions are infernal, can be considered representative of another 7, making a total of 15 that are highly likely to have sustained severe damage. Of the remaining five stations visited, three are out of commission because either their tanks or control rooms have been destroyed; at one of the stations, one tank was on fire and the other was slightly damaged. In general, it appears that at least a minimum 31 to 58 per cent of the stations were severely damaged (for a total loss of between $1.6 billion and $3.0 billion) and 12 per cent cannot be operated.

86. The mission's inspection showed that the downstream facilities of KOC also incurred heavy damage. They consist of various manifolds, two tank farms (north and south), pipelines to the refineries and offloading facilities, as well as the crude export facilities.

87. The central mixing manifold was heavily damaged but the filling manifolds for the south and north tank farms are intact. Damage to the two tank farms is major. Of the 35 tanks comprising the south tank farm, with a total storage capacity of 6 million barrels, 14 tanks were destroyed and 2 were damaged, for a lost capacity of about 3.3 million barrels, or 55 per cent. The south tank farm is mostly used to service the refineries but it is also connected to the north tank farm and the crude export facilities through a spur manifold. Of the 24 tanks that comprise the north tank farm, with a total storage capacity of 8 million barrels, 8 tanks were destroyed and 1 was damaged, for a lost capacity of about 3.7 million barrels, or 46 per cent. The north tank farm is basically dedicated to offloading crude for export. The two loading manifolds, which are downstream from the tank farms, were said to have been destroyed by Allied precision bombing in an effort to stem the flow of large quantities of crude oil that was being released into the Persian Gulf.

88. From the above it becomes clear that the KOC operations have been strangled: no oil can enter into its system and no oil, even if it were available, can leave it. The stranglehold is aggravated by the destruction at the crude export facilities. To make matters worse, the time required for rehabilitation will be lengthened since most of the KOC employees fled Kuwait during the occupation, leaving a minimal workforce of about 1,400 people, or only 28 per cent of its normal level.

C. Oil refining

1. Situation before 2 August 1990

89. On the eve of the invasion, Kuwait was producing about 750,000 barrels per day of refined products, most of it for export. The refineries and associated export facilities were operated by the Kuwait National Petroleum Company (KNPC), a subsidiary of KPC.

90. There are three refineries in Kuwait operated by KNPC: Mina al Ahmadi, Mina Shuaiba and Mina Abd Allah. A fourth one, at Mina Az Zawr, is operated by Texaco but owned by Saudi Arabia to process its share of the crude coming from the Wafrah area. All four are on the coast but only the three KNPC refineries are adjacent to each other. The latter three are connected through inter-refinery transfer pipelines and only a short distance from the crude oil facilities of KOC at Ahmadi. Their combined refining capacity amounts to about 820,000 barrels per day. In addition, the upgrading of their operations for higher grade products has led to the production of elemental sulphur (total capacity 2,350 tons a day) all of it for exports (at about $70 a ton).

91. Mina al Ahmadi, although dating from the late 1940s, has continuously been upgraded and has a total refining capacity of 390,000 barrels a day. It consists of three parts. The oldest section was revamped in 1970 and has a capacity of 120,000 barrels a day. The second section, following the refinery modernization project, was put into operation in 1984 and has a capacity of 170,000 barrels a day. The newest section was put into operation in 1986 following the further upgrading project and has a capacity of 100,000 barrels a day. The expansions of 1984 and 1986 were undertaken in order to produce higher grade products for export, such as lead-free gas and jet fuel.

92. Mina Abd Allah dates from the late 1950s but was entirely upgraded in 1987, including the installation of a sophisticated computerized central control system for the whole refinery. Besides a refined products capacity of 235,000 barrels a day, it also has a coker unit with a capacity of 2,200 tons a day. Mina Shuaiba was built in 1968 and was upgraded in 1978 from 90,000 barrels a day to a capacity of 195,000 barrels a day. Although it is the most recent vintage of the three refineries, it is at present the oldest one in terms of overall plant and equipment. It was in the process of being further improved and a central control system, similar to the one in Mina Abd Allah, was almost completed.

93. On 1 August 1990, KNPC was running a dynamic, fully integrated state-of-the-art refining operation employing about 7,200 people. It was generating some $20 million a day for the Kuwaiti economy. By the middle of 1990, exports of refined products and crude oil together, represented more than 90 per cent of Kuwait's total exports.

2. Assessment of damage

94. The mission inspected the KNPC refinery operations, which, like the crude oil-production facilities, were paralysed. No crude oil was able to enter the refineries. In any case, the refineries themselves had been damaged, albeit to varying degrees, thereby making processing impossible. The refinery at Mina Az Zawr, operated by Texaco, had been entirely destroyed.

95. All three KNPC refineries were closed down on 2 August 1990 in an extremely hurried manner. However, the refinery at Mina al Ahmadi was brought back on line some time during September 1990, reportedly in order to satisfy Iraqi military requirements and local demand, mainly for petrol. Only the revamped old section of the refinery was used for this purpose and production averaged about 75,000 barrels a day until mid-January 1991, when the plant was closed down once again.

96. The overall damage to Mina al Ahmadi is relatively slight. The control room for the crude distillator unit - which is the first and foremost essential process in any refinery - in the old section of the refinery was slightly damaged and some collateral damage was inflicted to the tower of the unit. An attempt was made to blow up the control room for the reformers (which are used to make lead-free and high-octane petrol) but the control panels escaped basically unscathed. The crude distillator unit in the refinery's further upgrading project was slightly damaged but appears operational. Minor damage was incurred by 10 of the 140 storage tanks for refined products. Two were blackened by fire and the remaining 8 exhibited bullet holes; all 10 can be repaired, however.

97. Mina Abd Allah suffered considerably more damage. Although the intricate refining components of the plant remained largely untouched, three important parts were destroyed. Foremost among these is the central control room or the nerve centre of the refinery, which was completely devastated by explosive charges. The control room contained state-of-the-art computer equipment (estimated at $150 million), including a PMX3-45,000 computer and a TDC-3,000 control system, and ran the operations of the refinery through an advanced control strategy software system. Not only was all the hardware destroyed, but the software, including its back-up copy, perished as well. There are, however, 8 to 10 satellite control rooms for various operating units of the refinery. It is at present unknown to what extent these are damaged as clearance for visiting them has not yet been given by the explosives ordnance disposal teams. Their outward appearance indicated no major damage. If they are in good condition, they could substitute for the central control centre. Without this knowledge, however, the refinery remains crippled.

98. The refinery is further strangled by the complete destruction of both a 20,000 horsepower pump house and its associated substation, which was used for pumping the refined products to the KNPC sea-island for exports, and the so-called inter-refinery transfer pump house for pumping the products to the other two refineries. Large sections of the pipelines to the KNPC sea-island and the inter-refinery transfer pipelines were destroyed.

99. Besides this destruction, other major damage was done to the following:

(a) The coke emergency storage room (capacity: 20,000 tons), in which about 7,000 to 10,000 tons of coke are smouldering owing to the lack of electricity required to operate the water cooling system (100 per cent loss at $60 a ton);

(b) The coke conveyor belt system, of which about 2 kilometres out of a total length of 3 kilometres, was destroyed by fire, making the offloading of coke virtually impossible;

(c) One of the three water-treatment skimming ponds;

(d) The fire pumps at the small boat harbour;

(e) The local control room for the two destroyed pumping houses.

The 68 product storage tanks (total capacity about 15 million barrels) incurred less severe damage: of the 6 tanks damaged, 4 had their floating-roofs sunk and 1 had its floating-roof blown off.

100. Mina Shuaiba incurred damage to its only crude distillator upon which production of refined products is dependent. The tower of the unit also appears to have been severely damaged and burnt. The nearby overhead pipelines for transporting products were destroyed over a length of about 70 metres. The isomax unit, which yields petrol and diesel fuel, was also heavily damaged and an electric substation that services a number of units was completely blown up, causing some collateral damage to an isocracker, a compressor and an emergency generator. It should be noted that the damage may be superficial. Consequently, a full assessment of the damage to the units can be undertaken only once an attempt has been made to start them up again.

101. The product storage tanks at Mina Shuaiba were also damaged. Of the 84 tanks (total capacity 12 million barrels), 5 were completely destroyed, for a total lost capacity of 1.26 million barrels. Nineteen other tanks were damaged to varying degrees by bullets and shells reportedly fired by Iraqi soldiers for target practice. One tank is riddled with bullet holes and may be unusable.

102. Even though some of the visible damage to the refineries may be superficial, the invisible internal damage may be major. The refineries at Mina Abd Allah and Mina Shuaiba were shut down within a few hours and the normal close-down procedures, which usually take about a week, could not be carried out. This may have caused major damage to equipment, catalysts, pipes, brickwork, pumps and vessels, and could result in costly repair and delays in restarting operations. Furthermore, a refinery lying idle for a considerable amount of time may develop problems even if it has not been damaged. It was impossible to appraise this likely damage because the refineries had neither power nor crude oil to start up production at the time of investigation.

103. Today, the KNPC operations, like those of KOC, are at a standstill. No refining is possible because no crude oil can reach the refineries. In any case, at least two of the three refineries cannot be operated because of the destruction or damage caused to their vital components. Furthermore, even if refining were possible, export would not be practicable since all offloading facilities from the three refineries were wrecked. Consequently, Kuwait not only lost revenues from its oil refining operations during the seven months of occupation, but it will continue to do so until all the numerous obstacles and bottlenecks have been removed. One immediate obstacle is the lack of human resources at the KNPC operations. Today only about 700 employees, or less than 10 per cent of the original workforce, are present.

D. Gas industry

1. Situation before 2 August 1990

104. Closely related to the oil industry is the production of natural gas and liquefied petroleum gas (LPG). Natural gas reserves at the end of the 1980s were estimated at 1.32 trillion cubic metres but were mainly in the form of associated gas and, therefore, dependent on oil output. This gas used to be flared until the late 1970s when an LPG plant was opened at the refinery at Al Ahmadi. The gas is separated from the oil at the gathering stations in the well areas and sent to the LPG plant after having passed through gas booster stations, also located at the well areas. The LPG plant had a capacity of 43 million cubic metres per day and supplied the local bottling plant with LPG for domestic use. The rest of the LPG was exported via the south pier at Mina Al Ahmadi. The dry gas, which remains after passing through the LPG plant, was sent to the power stations, the refineries, the petrochemical plants and other factories, such as those producing cement and bricks. By the late 1980s, Kuwait was producing almost 9 billion cubic metres of natural gas annually, of which about 72 per cent was marketed.

2. Assessment of damage

105. The occupation brought an end to the production of natural gas and LPG. Most of the natural gas is either burning or escaping with the gushing oil from those wells that have not been set on fire. Of the four gas booster stations, the one in west Kuwait was destroyed, another in north Kuwait was severely damaged and, of the two in south-east Kuwait, one was partially damaged and the other appears to be in good condition.

106. The LPG plant remains intact, as is the LPG bottling plant. However, 40,000 LPG cylinders and 45,000 regulators were looted and allegedly removed to Iraq.

107. Despite the relatively minor damage inflicted on the gas sector, this industry has also been crippled. The result is that the population of Kuwait, which uses LPG bottled gas mainly for cooking, is suffering a shortage of

gas. By early April the gas was being imported by dry cargo ships carrying road tankers because the only pipeline usable for importing LPG had been blown up. This same pipeline had also been used for exporting LPG; this source of revenue has now been closed.

E. Offloading facilities

1. Situation before 2 August 1990

108. There were a number of facilities for exporting crude oil, refined products and LPG. Four of them were at Mina al Ahmadi: (a) the south pier, dating from 1949, which had eight berths varying in depth from 12 to 15 metres; (b) the north pier, built in 1959, which had four berths with a depth of about 18 metres and could handle tankers with a tonnage of up to 100,000 tons; (c) the artificial sea-island, built in 1968, which could handle 375,000-ton tankers and consisted of a loading platform with six docking platforms in almost 30 metres of water; and (d) the single point mooring, which was controlled and connected by marine pipelines. The north pier could be used for exporting both crude and refined products.

109. The smaller ports at Shuaiba and Abd Allah were used for the export of products. The pier at Mina Shuaiba had four berths and could receive tankers with a maximum tonnage of 100,000 tons. Mina Abd Allah had an artificial sea-island in 13 to 17 metres of water and had an offload capacity of 214,000 tons.

110. On 1 August 1990, these port facilities, besides being fully integrated with the operations of KOC and KNPC, constituted the lifeline to the rest of the world, enabling Kuwait to export at that time 1.3 million barrels per day of crude oil and refined products.

2. Assessment of damage

111. The inspection by the mission clearly indicated that it was impossible, because of the systematic destruction of port facilities, to offload any crude, refined products or LPG, thus completing the stranglehold on the Kuwaiti oil industry.

112. At the north pier, all onshore crude offloading facilities were destroyed although the pipelines for the refined products were not damaged. The pier itself is intact and, since 1 April 1991, has been used to import petrol into Kuwait. The south pier, on the other hand, has a gaping hole of about 100 metres and all pipelines have been completely destroyed. Possible damage at the terminals could not be ascertained as clearance by EOD teams had not yet been obtained.

113. The sea-island, intended for exporting crude, was destroyed. The single point mooring appeared undamaged from the air but it cannot be used since it was controlled by the sea-island.

114. The pier at Mina Shuaiba was damaged in three different places with one large collapsed section and severed pipelines about one kilometre from the shore. The condition of the terminals is unknown, because they had not been cleared by the EOD teams. The sea-island at Mina Abd Allah could be viewed only from the air for similar reasons. It appeared in good condition but the control room may have been damaged. Still, it is impossible to use this facility because the pipelines leading to it have been blown up at the Al Ahmadi refinery.

F. Local marketing

1. Situation before 2 August 1990

115. Local marketing was mostly done through the 81 petrol stations in the country, which largely sold petrol, diesel, naphtha and lubricating oil. Total sales of lubricating oil, which was being produced at a plant near the Mina Shuaiba refinery, amount to about $26 million per year at $1,700 per ton. The other products had been selling at an average volume of 7 million litres per day at about $0.14 per litre, totalling about $358 million per year in revenues.

116. Natural gas was sold and distributed by means of a gas pipeline network to industries, municipalities, petrochemical plants, power stations, housing complexes, hospitals and other large consumers. LPG, which is mostly for domestic use, is sold in bottles of different sizes at various distribution points.

2. Assessment of damage

117. The above-ground facilities of six petrol stations were completely destroyed. The cost of each was about $175,000. The remaining 75 stations sustained damage to about 50 per cent of their above-ground facilities. The below-ground parts are free of damage, but most of the rolling stock was looted.

G. Petrochemical industry

1. Situation before 2 August 1990

118. The petrochemical industry is closely related to the oil industry and is operated by the Petrochemical Industries Company (PIC), which is a subsidiary of KPC. PIC runs two factories: a fertilizer plant and a salt and chlorine plant.

119. The fertilizer plant at Mina Shuaiba used natural gas from the LPG plant as feed stock to produce ammonia, urea and sulphuric acid (the production of ammonium sulphate had been discontinued). It consists of two parts. The old

complex, dating from 1968, had a capacity of 400 tons per day for ammonia, 1,000 tons per day for urea and 400 tons per day for sulphuric acid. The new complex consists of three ammonia plants (total capacity 2,600 tons per day) and two urea plants (total capacity 2,800 tons per day). There are three ammonia storage tanks and two urea warehouses with a total capacity of 76,000 tons and 100,000 tons respectively. Virtually all products were exported since domestic use was negligible, with ammonia and urea fetching about $105 a ton and $120 a ton respectively.

120. The salt and chlorine plant, also at Mina Shuaiba (the one at Shuwaikh had been taken out of production), dates from 1986 and was built at a cost of $105 million. Its operations require sea water and about 13,000 cubic metres of natural gas per day. It produced, besides salt and chlorine (capacity 150 and 75 tons per day respectively), caustic soda (both flakes and liquid), hydrochloric acid, sodium hypochlorite, compressed hydrogen and distilled water. Most of its products were used by Kuwait's water desalination plants.

121. Other than the PIC-operated factories, there are also a melamine plant (dating from 1980 and built at a cost of $100 million with a 15,000 tons per year capacity), which went bankrupt in 1985, and is now owned by the Kuwait Industrial Bank, and a plant owned by the Kuwait Chemical Manufacturing Company, which produced resins and unsaturated polyester. The latter plant was built in 1982 at a cost of $28 million. It has a capacity of 11,500 tons per year of alkyd resin, 3,500 tons per year of polyvinyl resin and 1,500 metric tons per year of unsaturated polyester. All these products, which fetch $4,200, $3,100 and $2,800 per ton, respectively, are mostly for export. At the middle of 1990, this plant was operating at 80 per cent of capacity, with annual revenues of about $50 million and employing some 130 people.

122. On 1 August 1990, Kuwait had a modern, dynamic petrochemical industry closely intertwined with the oil industry, supplying products to the desalination plants vital for the country's fresh water supply, earning a substantial amount of foreign exchange and employing some 2,000 people. In addition, plans were being finalized to build a new petrochemical complex, using LPG as its feedstock, thus creating a manufacturing facility for more advanced products such as raw materials for plastics.

2. Assessment of damage

123. At the time of the mission's visit, Kuwait's petrochemical industry was completely idle. Without natural gas, the fertilizer plant could not operate, although this was not the only reason for its inactivity. Many vital components of the plant had been removed and allegedly transported to Iraq and the remaining parts had been damaged.

124. It was noted that, at the time of the Iraqi occupation, the fertilizer plant had been kept in operation for about six weeks in order to convert an existing stock of ammonia into 35,000 tons of urea. This quantity, together with an additional 45,000 tons that had been stored in the warehouse, was said to have been removed to Iraq. A further 25,000 tons of urea that had been left in the warehouse had become unusable. The total value of the urea taken to Iraq and the amount that had become unusable amounted to $12.6 million.

125. Furthermore, the ammonia recovery unit (which had cost $1.8 million) and a new (1990) hydrogen recovery unit (valued at $2.3 million), both essential components of the new fertilizer plant complex, were uprooted from their foundations and reportedly transported to Iraq. This action effectively reduced the capacity of the plant by 86 per cent for ammonia and 74 per cent for urea. In addition, two trimmers at the end of conveyor belts were removed from the urea warehouses, thereby making it impossible to offload urea in bulk form at the Shuaiba dry goods harbour. Finally, some damage was caused to the ammonia storage tanks by shell and bullet fire.

126. The warehouse (built in 1986 at a cost of $1.8 million) for storage of chlorine cylinders, located about 20 kilometres south of the salt and chlorine plant on the road to Wafrah, was completely destroyed. Before its destruction, however, it appears that 240 chlorine-filled cylinders, valued at $3,000 each, were taken to Iraq.

127. The melamine plant was thoroughly stripped of all its major units. This loss is estimated at 75 to 85 per cent of its original value. The resin and unsaturated polyester plant was completely destroyed and only a shell of the facilities remains, along with a few ransacked buildings. Of the original investment of $28 million, nothing remains. All raw materials and products were looted; the loss is estimated at $7.8 million.

H. Support facilities and inventories

1. Situation before 2 August 1990

128. Kuwait imported virtually all of its capital equipment for the oil, gas and petrochemical industries. The equipment possessed a high degree of sophistication. Because of generous resource availability, the country had followed a policy of stocking large quantities of spare parts and of built-in redundancy in case supply lines were disrupted. There was also an impressive array of rolling stock, harbour equipment and vessels.

129. The offices of KOC, KNPC and PIC were housed in modern, concrete or brick structures and were well-appointed with top quality furniture and an ample supply of desk-top computers, photocopiers, facsimile transmission machines and other modern office equipment, which provided state-of-the-art design instruments.

2. Assessment of damage

130. Only the wreckage of these support facilities remained at the time of the mission's survey. Over 720 offices in 25 buildings that the mission briefly inspected had been vandalized, looted and in some cases utterly destroyed. File cabinets and desks had been forced open and their contents strewn about and destroyed. Almost all office equipment, even electrical outlets, had been taken. Offices had been stripped of furniture and carpets.

131. Besides the ransacked and looted offices, warehouses, workshops, toolrooms, laboratories, open air yards and other structures appear to have been systematically pillaged. The mission was informed that, from mid-August 1990 to mid-January 1991, the occupation authorities filled trucks with equipment, machinery, spare parts, inventory and, in short, anything valuable. In order to give such actions a legal cover, store issue vouchers were sometimes filled out by the Iraqi civilian authorities describing the items taken. Much looting was also reportedly done by the military.

132. It is impossible to give a full account of all the items that were removed to Iraq and the following listing is only meant as an illustration of a much longer inventory of the equipment lost. Thus, for example, it was reported that KOC lost four 5,000-horse-power tugboats, four out of eight pilotboats (the other four were damaged), one out of two barges, two crane barges, three mooring boats, all its oil skimming equipment and its anti-oil pollution barges. Its central radio station was stripped of its panels and was later heavily damaged by an allied air raid.

133. At Mina Shuaiba, all 20 cranes were taken, as well as the 2 ambulances and about 200 company cars. In addition, its lubricating-oil plant, with a capacity of 30,000 metric tons, lost all its inventory, cans and drums worth about $66 million. The local marketing network lost about $60 million worth of petrol, diesel, naphtha and lubricating oil, as well as some 50 cars and pick-up trucks.

134. Mina Abd Allah lost all 10 tractors of its coke tractor-trailer vehicles, 4 fire trucks, more than 200 company cars, 19 welding machines and a number of lathes. A 5,000-square metre toolroom had been emptied of its contents. The mission could see evidence that heavy equipment and machinery had been removed from their foundations.

135. Laboratories at all facilities were stripped bare of most of their chemicals and many testing instruments are missing. In general, the looting and vandalizing of warehouses, storage rooms and offices formed a pattern that was present at all the facilities of the oil, gas and petrochemical industries. It was carried out in a systematic and organized fashion: from almost the beginning of the occupation until mid-January 1991, inventories were stripped bare and loaded onto trucks for transport to Iraq.

I. Illustrations

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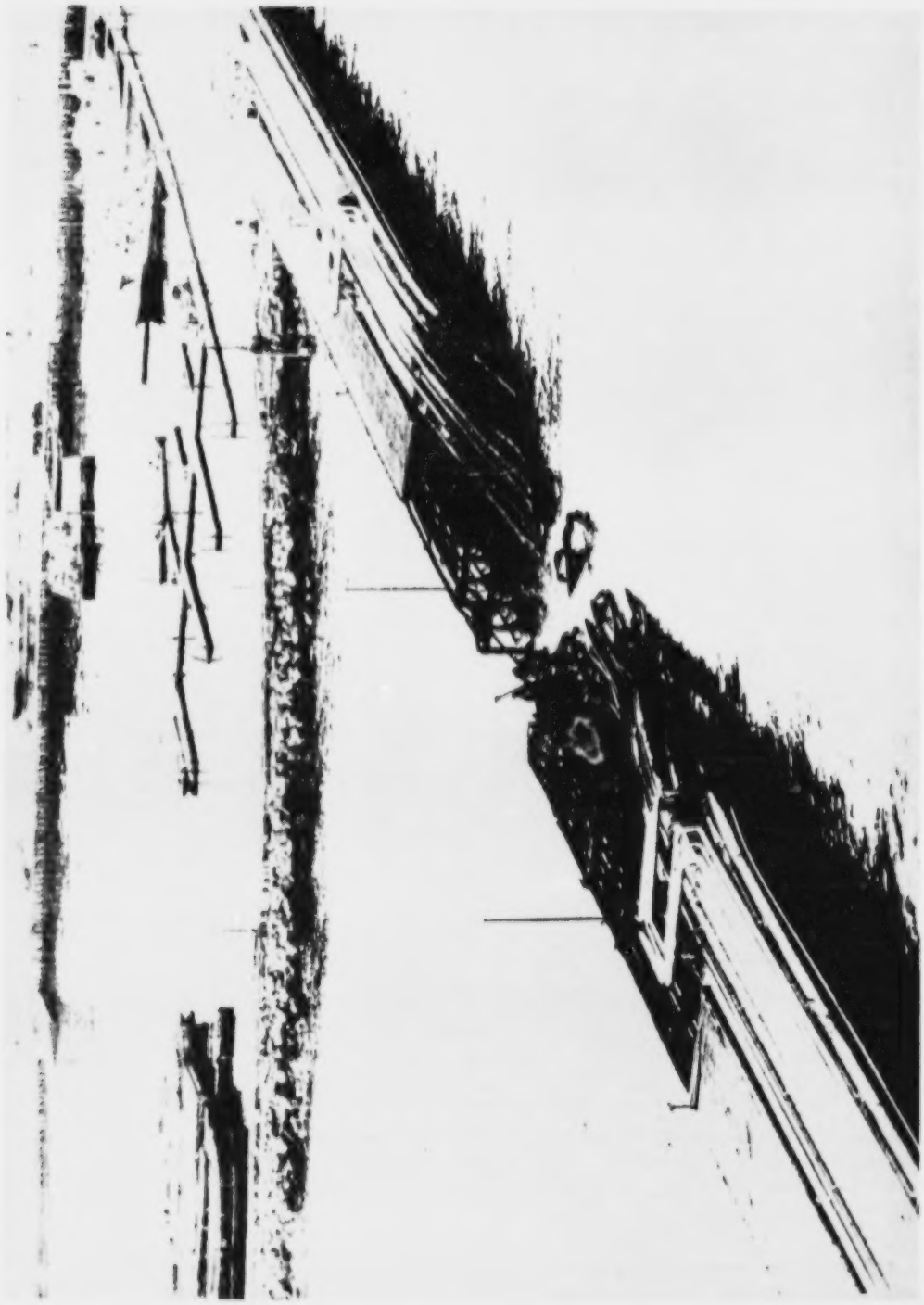


Figure 1

Petroleum Production Network

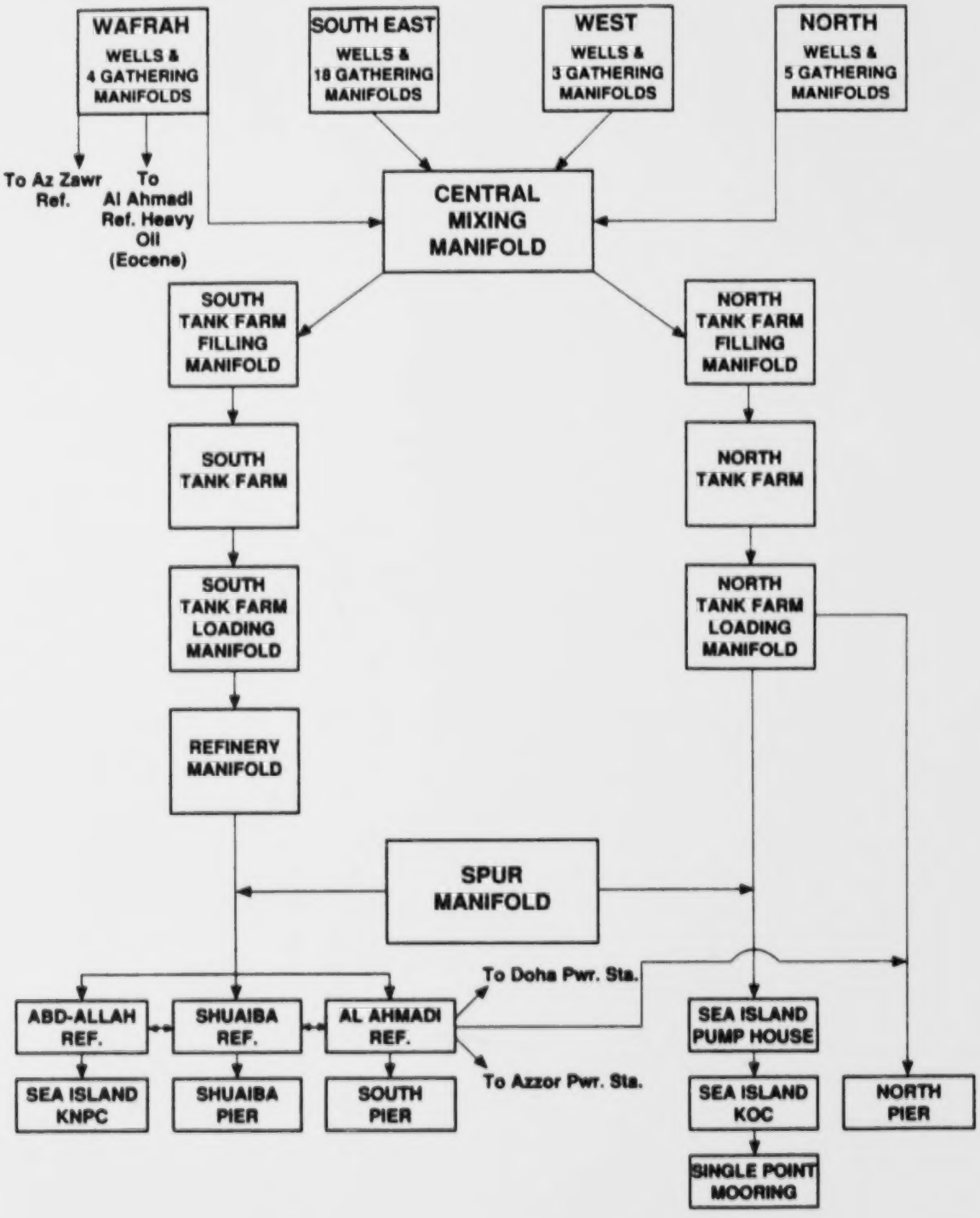
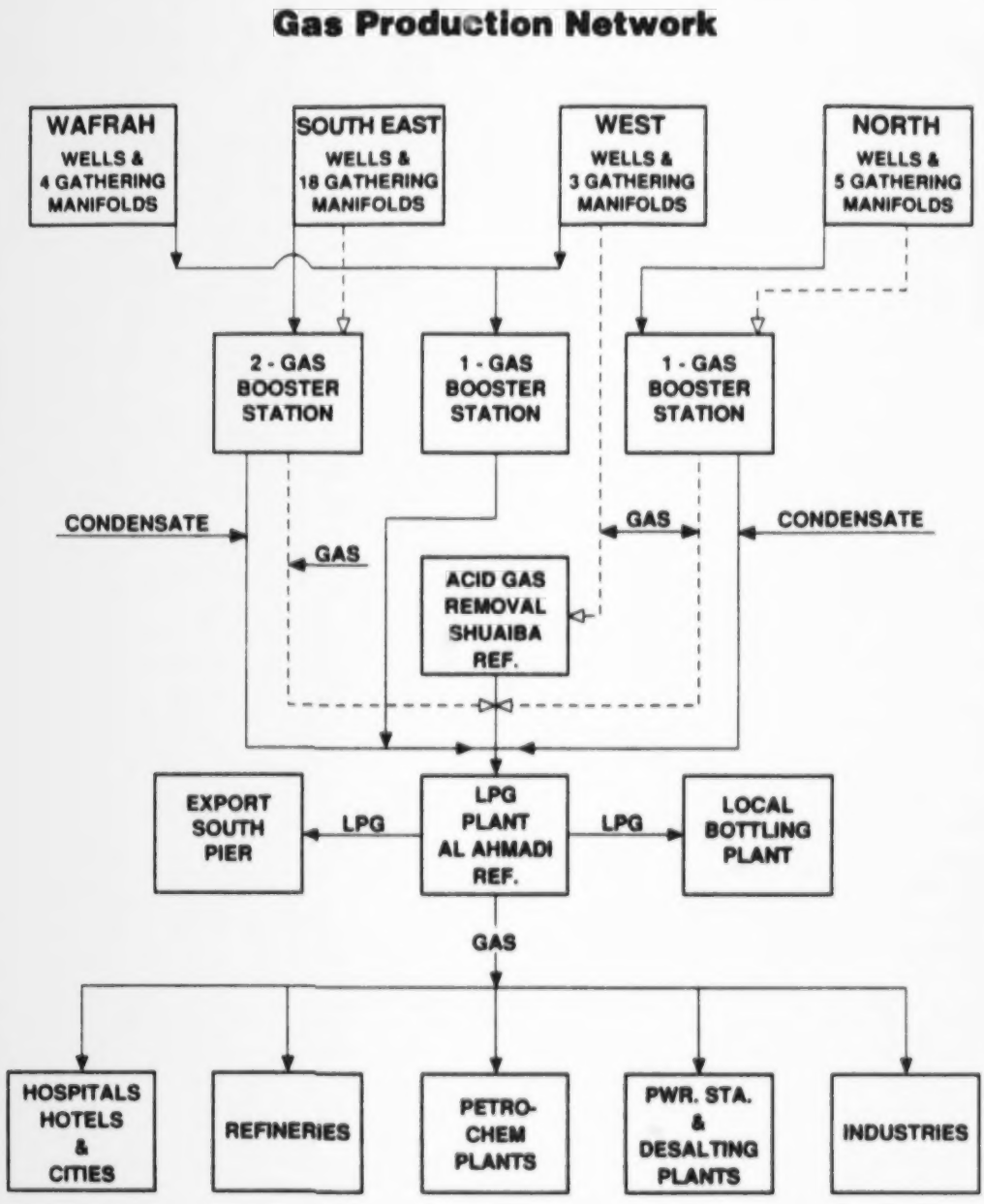


Figure 2


Gas Production Network
WAFRAH
WELLS &
4 GATHERING
MANIFOLDS
SOUTH EAST
WELLS &
18 GATHERING
MANIFOLDS
WEST
WELLS &
3 GATHERING
MANIFOLDS
NORTH
WELLS &
5 GATHERING
MANIFOLDS
2 - GAS
BOOSTER
STATION
1 - GAS
BOOSTER
STATION
1 - GAS
BOOSTER
STATION
CONDENSATE
GAS
GAS
CONDENSATE
ACID GAS
REMOVAL
SHUAIBA
REF.
EXPORT
SOUTH
PIER
LPG
LPG
PLANT
AL AHMADI
REF.
LPG
LOCAL
BOTTLING
PLANT
GAS
HOSPITALS
HOTELS
&
CITIES
REFINERIES
PETRO-
CHEM
PLANTS
PWR. STA.
&
DESALTING
PLANTS
INDUSTRIES

IV. ENVIRONMENT

A. Oil wells

1. Burning

136. The first reports of oil facilities ablaze in Kuwait came in late January as fire was set to oil installations in the Wafrah oil field. Subsequent news reports suggested that just prior to the ground war, about 150 wells were ignited. This was followed by reports that between 500 and 600 wells had been set afire.

137. The deliberate torching of the oilfields represents Kuwait's most pressing environmental problem of today, beside which all else pales into insignificance. There has never been anything like it in history before. The burning of the oil fields and the environmental effects of the burning are a direct consequence of Iraq's occupation of Kuwait.

138. KOC officials have reportedly concluded that Iraqi soldiers set explosives around the mouth of every oil well in the country immediately after the invasion but did not prime or detonate the charges until two or three days before the Allied ground offensive began on 24 February 1991. The exact number of oil wells burning is still not known officially but the mission estimates that it may have been about 700 at its maximum. Some have started to cone and go out and others are now being put out by fire fighters. The coning of a burning oil well occurs when oil is burned off faster than replacement oil can move in from surrounding oil strata. This allows the less viscous water in the strata below to move into the rock below the well intake and to be drawn up the pipe. The water-oil mixture does not burn properly so the flame goes out. A coned well cannot be restarted and the well has to be redrilled to below the point of water intake. This phenomenon means that the oil discharge pattern is changing as the number of oil wells on fire gradually decreases, while the number of wells gushing unburnt oil increases. This in turn results in the release of more oil onto the land.

139. Estimates of the amount of oil burned each day vary but are commonly thought to be between 2 million and 6 million barrels per day.

140. Each oilfield in Kuwait is producing its own emission cloud, mainly of particulates (including soot) and combustion gases. For practical purposes, there are three basic smoke plumes - southern, central and northern - of which the central is the largest and most dense, being produced by the Ahmadi, Maqwa and Greater Burgan fields. Although adjacent to others, each well fire seems to have its own individuality - a feature recognized by oil-well firemen - reflecting different conditions at the oil entry point and making smoke and gas emission variable.

141. By the end of March 1991, there was little factual information as to the nature and composition of the emissions into the atmosphere from the burning oil wells.

2. Gaseous and particulate emissions

142. Electricity was restored to parts of Kuwait City on 26 March 1991, which enabled one of the three fixed atmospheric sampling stations run by the Kuwait Environment Protection Department and that survived the occupation to begin operations again. Once calibration tests are completed, this station will be able to make authoritative statements on gaseous air quality in Kuwait City.

143. Few atmospheric composition measurements of any sort have been made in Kuwait since the occupation. A United States Environment Protection Agency team measured hydrogen sulphide and sulphur dioxide levels during the week of 11 March at Rawdatayn, Maqwa, Al Ahmadi and Greater Burgan oil fields. All gave low levels of both gases. If sulphur dioxide levels continue to be low, acid rain is unlikely to become a problem. Initial measurements of total hydrocarbons in the air suggest that levels of these substances are high. As yet, it is not possible to give information on individual hydrocarbon species. There are also no analyses yet of emitted particulate composition, especially in relation to heavy metals such as nickel and vanadium, which are present in Kuwait crude oil.

144. Medical opinion in Kuwait does not think that, at the moment, there is a serious environmental problem from the well emissions. In view of the little real information available, however, caution is advised until there has been an airborne investigation of the smoke plumes and a regular, ground-based air-monitoring programme has been re-established.

145. As state in paragraph 140 above, there are three basic smoke plumes. Each of the main plumes is relatively narrow. On 24 March, affected by southerly winds, the plume from the Maqwa field was approximately 5 kilometres wide where it crossed the coast, while the very dense black cloud from the Al Ahmadi and Greater Burgan fields was about 15 kilometres wide in total, with an inner, very black, core about 5 kilometres wide. This black core completely obscured the sun, making it look like midnight at mid-morning. Over the oil fields, the emission plume can, depending on the winds, be almost on the ground. More normally, the lower plume boundary is, over Kuwait, some 70 to 150 metres above the ground. The plumes gradually rise as distance from the emission source increases. In general, from unmeasured observations, plumes over the central Gulf area seem to have a lower level at about 1,300 metres and an upper level at about 2,500 metres. Smoke layers from the Kuwait fires have been observed in Bahrain and over the Islamic Republic of Iran, depending on wind direction. Eventually, the smoke plume will be dispersed by weather, with the particulates falling or being washed out by rain. Detailed profiling by a specially instrumented research aircraft is necessary to establish the shape of the plumes and their constituents.

146. Ground observations suggest that the visible elements of the emission have not gone into the upper atmosphere. This may be because the oil fires were insufficiently close to create firestorm effects, which could have carried particles into the upper atmosphere. On 24 March 1991, eight fires in the Greater Burgan field were seen to swing towards each other in what could

have been the start of a firestorm, but this effect lasted only a very short time. The apparent relatively large sizes of the particles may also be a limiting factor with regard to the height to which they are carried. Global climate change effects of the magnitude envisaged by some scientists are, therefore, probably unlikely.

147. Climatic effects will most likely be confined to the region, and more locally in Kuwait, where the sun-shield effects of the smoke clouds are more pronounced. When the plumes are at their most dense, sunlight does not penetrate and so is unable to heat the land in the normal fashion. Sandy desert areas do not retain heat for very long so that a few days of heavy smoke cover leads to appreciable local cooling beneath the cloud - perhaps 10° C or more. This is a temporary phenomenon, and when the plume swings away, the land heats again and air temperatures eventually rise. Kuwait authorities suggest that local air temperature lowering may have delayed the onset of spring flowering by as much as four weeks in many areas. There is, however, no quantified evidence for this and such a seasonal delay could still be within the range of natural variability.

148. Particulates from fires have been deposited on both land and sea over wide areas. In the Persian Gulf, as surveyed by the mission, they form a surface skin, which wind and currents shape into whorls and kilometre-long strands that resemble oil-slicks. The effects and consequences of these carbon deposits on the sea are not known. On land, the particles cover the ground surface and plants. In the proximity of well fields, this is mixed with unburnt oil given off as a fine spray.

149. Nothing is so far known about the composition of these particles. Samples have been collected but the analyses are not yet complete. It is not possible, therefore, to comment on the likely health and environmental consequences of these deposits.

150. The long-term consequences of this surface deposition are not known, including its effects on groundwater quality and on the soil seedbank. It is possible that it may help to improve the water retention capabilities of the soil.

3. Crude oil on land

151. A number of burning wells have begun to extinguish themselves naturally through the coning process (see para. 138 above). At the present time, it is believed that some 30 to 40 wells in the central and northern fields may already have extinguished themselves. The mission visited three such wells in the Maqwa field. For some time after their extinction, these wells continue to gush crude oil, pouring huge amounts on to the land. This outpouring of crude oil increased dramatically in the last two weeks of March 1991. As a result, there are now large lakes of crude oil.

152. Deep, 70-metre wide, torrents of oil have blocked roads. Oil rivers flow everywhere from the wells to newly formed oil lakes. The mission observed oil erosion of land where oil rivers scour erosion gulleys in the soil - a phenomenon that may be unique in environmental observation. Natural drainage of the land is towards the coast so that steps are being taken to stop vast amounts of surface oil flowing into the Persian Gulf. Engineers are, therefore, constructing earth-containment dams across valleys to make new oil lakes and to protect roads from oil flooding. Attempts have been made, with limited success, to reignite extinguished wells in order to reduce the oil flood. The potential input into the Persian Gulf from this flood was estimated at 60,000 barrels per day from the central fields and 20,000 barrels per day from the northern fields. Although once a danger, this is no longer considered a real threat since the earth-dam containment policy is working and the gushing wells are starting to be capped, thus reducing the oil flood.

153. The oil on the land will have to be taken off most areas by pumping, scooping or other means and retained in special oil-holding areas until suitable disposal can be arranged. Rehabilitation treatment of the remaining oil-soaked areas is still uncertain. Proposals under consideration include plowing or harrowing to mix the oil layer with sub-surface soil and sand. It is not known how successful such measures may be and the future of these oil-soaked lands will be one of Kuwait's more obvious environmental problems arising from the occupation.

154. Another major problem that must be faced urgently is the measurement of sulphur dioxide, hydrogen sulphide, carbon monoxide, nitrogen oxides, ozone, carbon dioxide, specific volatile compounds such as benzene, phenols, toluene and formaldehyde, as well as particulates from gaseous and particulate emissions. Also specific health-effect studies will be needed since the range of pollutants in the atmosphere of Kuwait could cause serious respiratory illnesses or have long-term carcinogenic and mutagenic effects.

B. Oil and the marine environment

1. Conditions in the Persian Gulf

155. In late January 1991, a massive amount of oil was reported in the Persian Gulf off the coast of Kuwait. The exact origins of this release and its volume are still matters of some controversy. A special UNEP mission to Saudi Arabia overflew the slick on 7 February and estimated its volume at 1 million barrels or less. It concluded that the oil slick along the Saudi Arabian coast was most likely the main oil slick from the January release, although it did not rule out the possibility of other slicks being in northern Persian Gulf waters. It was not able, for security reasons, to overfly this part of the Persian Gulf to make a determination.

156. The present mission had, therefore, as a major objective to determine whether any major oil slicks were present in adjacent areas of the Persian Gulf. It found no indication of a major oil slick anywhere along the Kuwaiti

coast and offshore as far as about 30 kilometres seaward. However, several patches of thin oil sheen of limited size were observed at different localities closer to the coast, within a range of 2 to 3 kilometres. In one place only, a small slick of heavy-looking oil was observed within 1 kilometre of the coast, extending between Al Fuhayhil and Ra's al Mangaf, i.e., for about 3 kilometres along the coast. The only relatively large amount of heavy black oil was found contained in the commercial harbour of the Kuwait Fisheries Company at Mina Shuaiba.

157. During the mission's aerial surveys of the coast (20 and 22 March 1991), narrow bands of black carbon particles extending over varying distances were observed, obviously resulting from atmospheric deposits of carbon emitted with the soot from the burning oil wells.

158. There was no indication of any massive fouling of beaches. Only in a few scattered sites along the Kuwaiti coast visited by the mission were oil traces and deposits found. For example, accumulated black oil was observed on the beach inside coastal embayments where oil is likely to be trapped (in Al Fuhayhil, e.g.). In the southern part of the coast, near Umm-Qusubah, oil was found on the beach under 10 centimetres of sand. Also during the mission's aerial survey on 20 March 1991, some black oil was noted onshore in two small stretches of the shoreline close to the amenity facilities in the Al Khiran area.

159. KOC officials, in their briefing to the mission at KOC headquarters at Al Ahmadi, stated that the occupation authorities had begun to build up the storage quantities for release into the Gulf. According to the KOC log books, there were 10.7 million barrels in storage at 22 January 1991. Shortly after that date, the Iraqis reportedly released the oil from the tank farms to the sea through the pipelines leading to the KOC sea-island. A few days later, an Allied precision bombing air raid destroyed the two loading manifolds downstream from the tank farms as well as the KOC sea-island, thereby effectively halting the flow of crude oil into the Persian Gulf. There were only 1.5 million barrels left in the tank farms. It is estimated that at least 6 million barrels of oil were released. The balance (3.2 million barrels) may have been partly removed to fill in the defensive trenches along the Kuwait-Iraq border and the rest probably burnt.

160. The above statement by the KOC officials accounts for 6 million barrels of crude oil released into the sea. They further confirmed that there were three Iraqi oil tankers anchoring off the north pier, each of 200,000 tons of crude oil capacity, with a total maximum of 600,000 tons, or 4.2 million barrels. These ships were said to have deliberately unloaded crude oil into the Persian Gulf, as the ships were seen rising gradually as they released their oil contents. One of these ships was damaged by the same air raid described above, which stopped its release of oil.

161. A satellite image taken on 25 January 1991 shows a long plume of smoke originating from two close-by sources about 16 kilometres off shore: the bombed sea-island and the tanker. This means that the spillage occurred

sometime during the period from 22 to 25 January, sufficiently long to achieve the 6 million barrel quantity dumped. By means of scaling from the same image, it is possible to determine that the oil-slick was about 50 kilometres long and 8 kilometres wide on 25 January. Assuming that the slick had an average thickness of 0.5 centimetres, the resulting volume could be as large as 2 billion litres (13 million barrels) or more than sufficient to contain the 6 million barrels released from the tankfarms and the 4.2 million barrels from the tankers.

162. In the light of the above, it seems reasonable to assume that such an oil-slick was formed on or about 24 January 1991. However, it is evident that a large portion (about 50 per cent) of the slick has quickly evaporated. The remainder, under weathering effects and degradation, has diminished and broken into small patches which moved southwards and reached the Saudi Arabian waters in a much lesser amount of approximately 1 million barrels. This was clearly observed and confirmed by a UNEP expert mission to Saudi Arabia.

2. Effects on the marine environment and related activities

163. The "sheen" effects on the sea surface appear when the oil surface film is less than 1.5×10^{-4} millimetres in thickness. At this thickness, the oil film probably reflects more light than it absorbs but no work appears to have been done to examine the light effects of oil pollution upon phytoplankton primary production.

164. Perhaps of greater concern are macrophytes such as seagrasses. These will be affected both by toxic hydrocarbons and contamination of sediments. Oils penetrate stomata and can lead to death of the plants. Seagrass beds provide the nursery grounds for commercially important shrimps. So, even if the seagrass beds are not subject to direct oil pollution because of their depth, the young shrimp may be affected by the toxic residues of partially degraded oil. Shrimp, which breed in spring, live for little more than a year, so contamination of the seagrass beds now could severely reduce shrimp catches for a whole year and lead to significant reductions in the following year. Apart from their importance to shrimps, the extensive seagrass beds provide food and a habitat for a wide variety of marine organisms and are a major contributor to the productivity of the Persian Gulf.

165. Another fragile ecosystem existing in the Kuwaiti marine environment is the coral reef communities that occur at the three coral islands - Kubbar, Qaru and Umm Al Maradim. The parts of these reefs that are very close to the surface will be at risk from direct oil impact, especially if oil coats the corals during extreme low tides. The polyps of which the reefs are formed are also highly sensitive and easily killed, either by direct smothering with oil or ingestion of oil droplets in the water column or toxic oil derivatives. Recovery will be slow because corals are already at the limit of their distribution in the high salinities and temperatures of the Persian Gulf waters.

166. Furthermore, in the coastal waters of Kuwait, particularly in the north and around Bubiyan Island, there is a very broad inter-tidal zone, with extensive mudflats coated with blue-green algae which provide the basic input for the food chains of many fish and crustaceans. These mudflats also provide the feeding grounds for numerous species of wading birds. The beaching of oil on such mudflats will not only smother the surface algae, but will also kill the fauna of worms and crustaceans upon which both fish and birds feed.

C. Land degradation

1. General considerations

167. In its overflights and ground surveys, the mission found that large parts of rural Kuwait showed land degradation dating to before the occupation. Overgrazing effects were widespread. Other areas known to be favoured for seasonal camping showed vegetation reduction, while vegetation composition suggested that woody shrubs were less prevalent in these areas than might be expected. Environmental factors resulting from the war enhanced impacts on these areas because they have been subjected to stress from prior forms of land usage.

168. Land degradation is taken here to mean all forms of land disturbance that have altered the basic surface soil structure and its overlying vegetation cover. All data on land degradation were gathered by the mission during overflights and ground field trips. The mission also held discussions with Kuwaiti Environment Protection Department staff.

2. Military fortifications

169. The Iraqi military fortified many areas of Kuwait prior to the Allied ground offensive. These fortifications were particularly well developed along the southern border of Kuwait and along the entire coastline but especially in the central part where sea-borne Allied landings were expected. However, defensive constructions abound in most parts of the country, being most abundant along roads, around military and communication centres and on most high ground.

170. Those constructions, made of stone and concrete, will persist unless they are removed. Such removal will be necessary in urban areas and in scenic and tourist regions such as at points along the coast and on the escarpment in the Jal Az Zawr National Park.

3. Off-the-road vehicle movement

171. The movement of large numbers of wheeled and tracked vehicles over desert lands can break up the upper sand and soil horizons leading to subsequent wind and water erosion. Repeated damage by vehicles can cause mortality of

perennial desert herbs and tussock grasses such as Panicum turgidum. Tanks and other tracked vehicles are generally thought to be more destructive in these respects than vehicles with wheels.

172. During the ground war, several thousand Iraqi and Allied vehicles were driving across the desert plains of Kuwait. Several engagements were fought, involving manoeuvring of heavy tracked vehicles, often at speed. The potential for soil and plant damage was, therefore, considerable.

173. Aerial surveys by the mission showed that in many areas, particularly in western Kuwait, there were sets of old tracks made by wheeled vehicles, as well as newer tracks from the recent war. The old tracks were presumably from pre-war camping, hunting or oil survey parties. They stood out as twin bands of very green, often shrubby, vegetation resulting from the current widespread rains. The early wheel tracks functioned here like the hollows described above, with resultant increased plant growth in the wheel ruts. In some areas, the newer wheel and tracked vehicle traces will heal through vegetation growth. In other areas, however, the tracks will erode owing to wind action blowing sand and soil particles into the air. Kuwait is known for its seasonal dust storms and dust fall-out onto Kuwait is perhaps the highest in the world. The number of dust storms and their severity may well increase as a result of the abundance of loose sand and soil particles within newly formed wheel tracks. Some of these additional wind-blown particles may be deposited on coastal marine ecosystems. These problems will persist until the re-establishment of a soil stabilizing vegetative cover.

4. Geographical distribution

Coastal zone

174. This zone (see map 3) consists of the beach together with a strip of land fronting the shore. The width of this strip varies according to locality, reaching in places up to some 300 metres from the shoreline.

175. The Iraqi occupation forces constructed very heavy defence lines along the entire length of the sea coast. Bubiyan Island has substantial defences around its south and east coasts but not its west and north, which face Iraq. Faylakah Island is entirely ringed by coastal defences. As far as could be determined, none of the other islands overflown had sea defences (Umm Al Maradim, Kubbar, Quhat and Mashkan). The normal pattern of coastal defences involves one or more outer lines of barbed wire in the sea as fences or coils, a mixture of stakes in the sand and concrete blocks, followed by more barbed wire on land. These are backed by machine-gun positions, gun emplacements and armoured vehicle revetments. Obstacles impeding vision and field of fire have been removed and buildings converted to firing positions. Shoreline defences are intermingled with minefields. These defences are most complex in the southern part of the country and along the coastline of the whole urban complex. On the very southern coastline there are some vehicle disturbances and some craters. From Al Jahrah northwards the coastal defence

works became less complex, being reduced to lines of barbed wire with, in places, trenches behind. These defences are in association with mine fields. Vehicle track disturbances and crater formation are not extensive. The environmental disturbance from Al Jahrah to the Saudi Arabian border can in general be classed as severe to very severe. There are a few patches, however, where disturbance is only light to moderate. From Al Jahrah northwards disturbance is mainly moderate but light in some places.

South-east zone (south of the Managish-Al Jahrah line)

176. Gun emplacements, armoured vehicle revetments, trenches and the like are commonplace everywhere, particularly on raised areas and at points commanding roads, communication centres and other strategic locations. Disturbance is moderate to severe in areas where constructions occur. Crater damage and vehicle track disturbances are severe to very severe in areas near the Saudi Arabian border and in zones bordering the main road to Kuwait City. The international border in the south is marked by fences and two parallel 4-6 metre high sand berms separated by a wide, deep ditch that was intended to be filled with oil. Elsewhere vehicle track damage is slight to light and there are relatively few craters.

North-east zone (east of the Al Jahrah-al-Abdali line, excluding Bubiyan Island)

177. Constructions are found along all roads, on all elevated positions and around all oil fields, military camps and harbours. Constructions are extensive on top of, and behind, the Az Zawr ridge. On open sandy areas, particularly near the periphery of the zone, there is tracked vehicle damage. Craters occur near all military positions. In strategic areas, disturbance is severe, but elsewhere it is moderate. Trenches and vehicle revetments can be found in the remotest of areas, although they are not normally extensive.

Bubiyan Island

178. There is some defensive construction but only moderate vehicle track and crater disturbance in some places. In general, Bubiyan Island seems not to have been greatly disturbed.

North-west zone

179. There are scattered constructions throughout, becoming very prevalent in the north close to the Iraqi border. Ammunition dumps, fuel-bowser centres, vehicle revetments, trenches and bunkers of many types abound. Vehicle track damage in the north is severe in places. There are very disturbed areas where large numbers of heavy tracked vehicles manoeuvred, churning the soil in the process. Elsewhere such vehicles advanced cross-country in line-abreast formations, creating extensive parallel tracks. Where military constructions occur, craters abound. In the northern part of the zone, the disturbance in places is severe to very severe; elsewhere, it is moderate. In the southern zone, disturbance seemed mainly light, except along main roads. Some mainly east-west oriented oil trenches were found in a number of places.

South-west zone

180. Scattered constructions occur on high ground and along the extensive mine field that crosses the southern part of the zone from east to west. The southern border of Kuwait has parallel lines of sand berms and trenches to contain soil. There are few cratered areas. Where pathways were cleared through the border defences and the minefields, there is severe local disturbance of the soil where vehicles funnelled into and out of crossing points cleared of mines. Over most of the zone vehicle tracks are sparse or absent, making this zone, over all, the least affected of all the zones.

Other land degradation types

181. In the time available to the mission, it was not possible to examine all forms of land degradation. Based on documented experience in other war zones, the following are land degradation activities that are likely to have occurred: cutting of shrubs and trees for firewood and camouflage; damage to anti-desertification greenbelt plantations; and the burning of vegetation, both deliberately and inadvertently through ordnance explosions, burning vehicles and ignited fuel. Other likely adverse environmental activities include the shooting or killing of wildlife for sport or food and the contamination of soil and groundwater through seepage of fuel and oils, toxic camouflage paints and other similar substances.

National parks and reserves

182. Before August 1990, Kuwait was in the final stages of preparing a detailed protected areas system. Three sites had been officially established from a series of nature conservation areas which were proposed in its marker action plans, the most well-known of which is the Jal Az Zawr National Park near Kuwait City.

183. The Wadi Al Batin Desert Park is crossed by the main east-west minefield and its associated structures. Scattered earthworks and other constructions occur in some areas, especially on high ground, but most of the park seems to remain unaffected by the war.

184. The Umm-Nigga Desert Park is difficult to locate on the ground from the air. It is crossed by tracks, roads and pipelines (some damaged). Structures of various types are along roads and on high ground or near strategic points. Trenches and bunkers have been built along parts of the shore of the Khawr as Subiyah.

185. The Jal Az Zawr National Park, the ridge crest and areas to the north of it contain extensive substantial military constructions. Those on the ridge area are obtrusive and should be removed. The foreshore has defensive constructions but these are not extensive. The trenches and other earthworks will gradually disappear. The barbed wire, particularly that in the water, should be removed. On the whole, the foreshore and adjacent marshes are in good condition.

D. Mines and other unexploded ordnance

1. Background

186. During its seven-month occupation of Kuwait, the Iraqi military took steps to fortify the country against invasion by the opposing Allied forces. An important part of their fortification was the laying of mine fields, on land and in the sea, across likely invasion routes and around installations and positions considered to be of strategic significance.

187. The Allied aerial bombardment of Iraqi forces in occupied Kuwait lasted from 17 January 1991 until their final withdrawal from Kuwait on 27 February 1991. Both this aerial bombardment and the accompanying military movement into Kuwait, and subsequent engagement of Iraqi forces, by Allied ground units (24-27 February 1991) involved very considerable use of explosive ordnance by both sides. For a variety of reasons a proportion of this ordnance did not explode and a large part was abandoned by Iraqi forces.

188. Mines and other unexploded ordnance together constitute a major and perhaps long-lasting threat to the environment of Kuwait and to the security and well-being of its people.

189. Both anti-tank and anti-personnel mines were used. The standard anti-tank mine is the VS 2.1 kilograms. Anti-personnel mines include the VS 50, SB 33 and the Valmara 69 jumping mine. The mines are constructed almost entirely of plastic with only the firing pin of metal. They are, therefore, very difficult to locate with most mine-detecting equipment. International agreement calls for the mine-laying party to insert metal pellets in special pockets in the explosive mass as an aid in mine detection at the end of hostilities. The metal pellets were not inserted by the Iraqi forces.

2. Location of minefields

190. All information on geographical distribution of the minefields (see map 4) is based on Kuwait Danger Areas maps, 19 March 1991 edition.

Coastal zone

191. With minor exceptions, the whole Persian Gulf coast of Kuwait from Iraq to Saudi Arabia was sown with a combination of anti-tank and anti-personnel mines. The minefields form part of an overall coastal defence system involving submerged offshore marine mines and an onshore arrangement of barbed wire, stakes, blocks, trenches and gun and tank emplacements. The mines have been laid both above high tide levels and in the inter-tidal zone. To avoid them floating, mines placed in the inter-tidal zone are sometimes individually tied to a mesh net that is itself pegged to the ground surface. In most cases, the mines are covered by sand or only slightly protrude from the surface. Operations at the Shuwaikh port, which has a very narrow access, were rendered particularly dangerous because of the proliferation of sea mines.

Southern zone

192. The most extensive minefields in Kuwait are in the south of the country behind its border with Saudi Arabia. Between Al Khiran on the coast and the Manaqish oilfields in the west, the minefields are in solid, roughly parallel lines three or four minefields deep. From the Manaqish oilfields to the Hudud As Salmi custom post in the extreme west of Kuwait, and beyond into Iraq, there is a single continuous set of minefields with outlier fields in front and behind. Very large numbers of mines were used in these fields. On those crossed by the Wafrah road where the mines were visible, the mission estimated the density as 2 to 6 mines per square metre depending on mine type. In Kuwait a mixture of anti-personnel and anti-tank mines was used. In those Wafrah fields examined, most of the mines seen were anti-personnel and linked by trip-wires.

Central zone

193. Extensive minefields (anti-personnel and anti-tank) were set along the north coast of Kuwait Bay and in a southwest-northeast line just to the north-west of Al Jahrah. This defensive line is backed by secondary lines just behind the Az Zawr heights and by areas near a few centres of strategic interest, such as the air bases, army barracks and communication centres.

Other areas

194. Minefields occur at sites of strategic concern in and around Kuwait City and at a few isolated locations in the south and central areas. Faylakah Island has three known minefields in its central area away from the coast - two in the west of the island and one in the east - all containing predominantly anti-personnel mines. Apart from the minefield that crosses the western border of Kuwait in the extreme south-west, there are no other known minefields in the west and north of Kuwait along its borders with Iraq.

3. Unexploded ordnance

195. Unexploded devices can be found anywhere in Kuwait, particularly where battles took place or targets were attacked. Kuwait Danger Areas maps show the locations of some abandoned tanks or military equipment, but not all. Buildings in Kuwait City and other urban areas still contain many explosive devices. By 28 March 1991, 3 million such devices, including mines, had been cleared from Kuwait City and adjacent areas. No information was obtained by the mission on unexploded bombs and missiles.

196. Commonly encountered devices include cluster bombs/bomblets and unused ammunition ranging from small arms to rocket-propelled grenades and large artillery mortar shells. These are normally found in ammunition dumps or with abandoned guns, tanks and other military equipment. Booby traps were still being encountered at the time of the mission.

4. Unexploded ordnance disposal

197. The military of six nations (United States of America, United Kingdom of Great Britain and Northern Ireland, France, Canada, Saudi Arabia and Kuwait) were coordinating their search, detection and removal operation through the EOD group from their headquarters with the Combined Civil Affairs Task Force (Camp Freedom). By 19 March 1991, a few areas had been cleared, including the runways and aprons of Kuwait International Airport, Shuaiba harbour and a few lengths of beach and seafront in Kuwait City (Kuwait Danger Areas maps, 19 March edition).

198. The military have experienced casualties in these clearance operations. In the future, it is expected that most clearance operations will be done by specialist civilian companies under contract to the Government of Kuwait. The question of insurance liability for those injured by explosive devices in areas said to have been cleared remains to be solved.

199. Mines and other explosive devices pose a hazard to the civil population that will persist for some time to come. Kuwait currently has a much smaller population than its pre-war level. Even with this low population, injuries from ordnance explosions are occurring at the rate of 4 or 5 per day, usually involving severe injuries to arms and legs according to reports from emergency rooms at hospitals. Souvenir hunting among abandoned Iraqi military vehicles and among the quite large number of small ammunition depots all along the coast had by 20 March 1991 reportedly led to more than 50 deaths.

5. Future implications

200. All the mine and ordnance experts consulted stated that there is no guarantee that swept areas are entirely free of explosive devices. Kuwait Danger Areas maps mark the cleared areas in green and accompany them with the following warning legend: "Area swept - approach with caution". These same experts were unanimous that large areas of Kuwait have so many mines that it is impractical to lift them, particularly the vast minefields that cross the southern part of the country. Mine experts recommend that these areas be clearly indicated and very securely fenced. A number of passageways will have to be cleared through these minefields where they form a barrier to the seasonal movement of pastoralists and their livestock or to recreational and leisure safaris.

201. Several of the actual and proposed protected areas of Kuwait contain minefields and unexploded ordnance. These dangerous areas could be securely fenced to exclude the public and overseas visitors. The Jal Az Zawr National Park on the north of Kuwait Bay is particularly affected since minefields have been set along its coastal flats and marshes, and along parts of the top of the escarpment - both areas of prime interest to visitors. Other proposed national parks or reserves that now contain minefields include the Wadi Al Batin Desert Park (large minefields in its southern area) and the Umm Al Maradim Marine Park (mines and unexploded ordnance along much of the coast;

some minefields may also be found in the land part of the reserve). The Faylakah Marine Park should be free of mines, although they may be encountered in other parts of the island.

202. The beaches of Kuwait - and to a considerable extent mined coastal waters also - pose the biggest environmental hazard from munitions because they provide one of the main recreational areas for the people. Although some parts can be fenced off, the majority will have to be swept as effectively as time and resources allow. It must be recognized, however, that there are likely to be injuries from explosions from time to time for several years to come. Because of the large concentration of mines placed it will be virtually impossible to achieve full guarantees after the cleaning.

203. A programme is required to educate the people, including the pastoralists, to the dangers of entering fenced-off minefields and of encountering unexploded devices. In addition, medical services must be prepared to cope with this new form of injury and the public must be educated as to how to respond when explosion injuries occur, and on how to summon the most immediate help.

E. Environment-related infrastructure

204. The Environmental Protection Council of Kuwait is the body that oversees the collection and interpretation of environmental data and advises the Government on its direction and policies with regard to the environment headed by the Minister of Public Health.

205. The Environmental Protection Department has five sections (research, finance, administration, public relations and information) and a computer centre. The research programme carried out by the technical divisions includes monitoring and assessment activities in air pollution, water pollution, soil pollution, terrestrial ecology and marine science. Technical facilities operated by the Department include three fixed air pollution monitoring stations (at Mansouriya, Rabia and Reqqa), which have produced monthly reports since 1984. In addition, the Department operated five mobile air pollution monitoring laboratories to cover general air pollution as well as some specialized pollutants such as hydrogen sulphide, particulates and noise. There were also some 10 dust-sampling stations. Three well-equipped marine research vessels were operated, together with a small but well-equipped marine laboratory at Al Bidaa.

206. During the occupation, three mobile air pollution monitoring laboratories were removed by occupation forces. The three marine research vessels were either removed or destroyed. The marine research station at Al Bidaa, on the waterfront, had soldiers living in it who swept all the equipment outside to make room for their crew's accommodation needs. The station is now completely wrecked and the equipment ruined. The Industrial Medicine Centre in the Shuaiba Industrial Area was also completely vandalized.

207. Another centre at Shuaiba, which is run by the Shuaiba Area Authority, has been reported as completely looted and destroyed. The centre included several laboratories that were fully equipped for industrial pollution monitoring, including continuous air and water pollution monitoring by fixed stations.

208. The Department's Computer Centre, with its mainframe Vax and its supporting microcomputers, survived intact. It is not operating because of a lack of electricity; the computers have also been without maintenance for several months. The three fixed air monitoring stations also survived intact but need electricity to make them functional. Each station when operational monitors wind direction and speed, temperature, relative humidity, NO_2, methane, non-methane hydrocarbons, ozone, carbon monoxide, NO, NO_x. One station also monitors ultraviolet and infrared. One station in the industrial sector was visited. It is situated on top of a local medical clinic. The clinic had all its equipment removed. The air monitoring station was left because the Technical Adviser to the Department told the removal crews that the instruments were fixed and would break if moved and that they would be in trouble if they delivered broken equipment to Baghdad. They contented themselves by pulling out all the computer paper and stealing the three fixed air-conditioning units.

209. Some staff trained to operate the stations are available locally. Most were expatriates who have left Kuwait. Several expatriates have indicated their willingness to return as soon as the situation improves and they are allowed to enter Kuwait.

210. The mission was also informed that all the stockpile of equipment and material for combating oil pollution had been removed and transferred to Basra during the early days of the occupation. The equipment, partially imported and partially produced locally, was an essential part of the Kuwaiti national contingency plan for cases of oil pollution emergency. The equipment included 14 oil skimmers; 10,138 metres of booms of different types; 9 oil pumps; 782 barrels of chemical dispersants of different types, 3 boats, 2 cleaning cars; training equipment; 1 generator; and several other items. This equipment had on several occasions been used for the training of regional experts during courses organized by the Regional Organization for the Protection of the Marine Environment.

211. The mission was provided with seven lists of items looted or destroyed during the occupation, covering fixed and mobile air and water quality monitoring stations, marine research stations and laboratories, office supplies, research vessels, transport and communication facilities and the oil pollution combating equipment.

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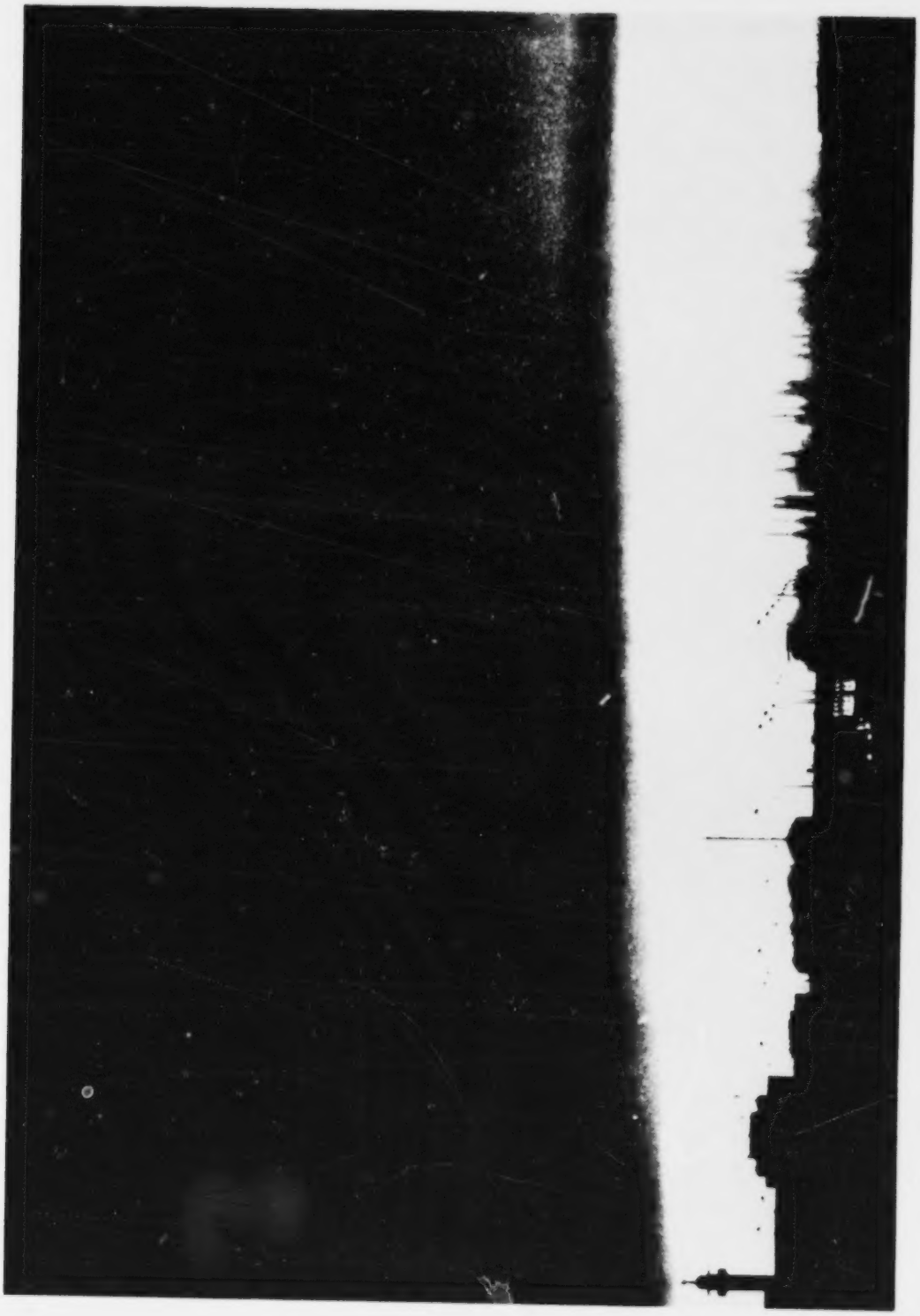
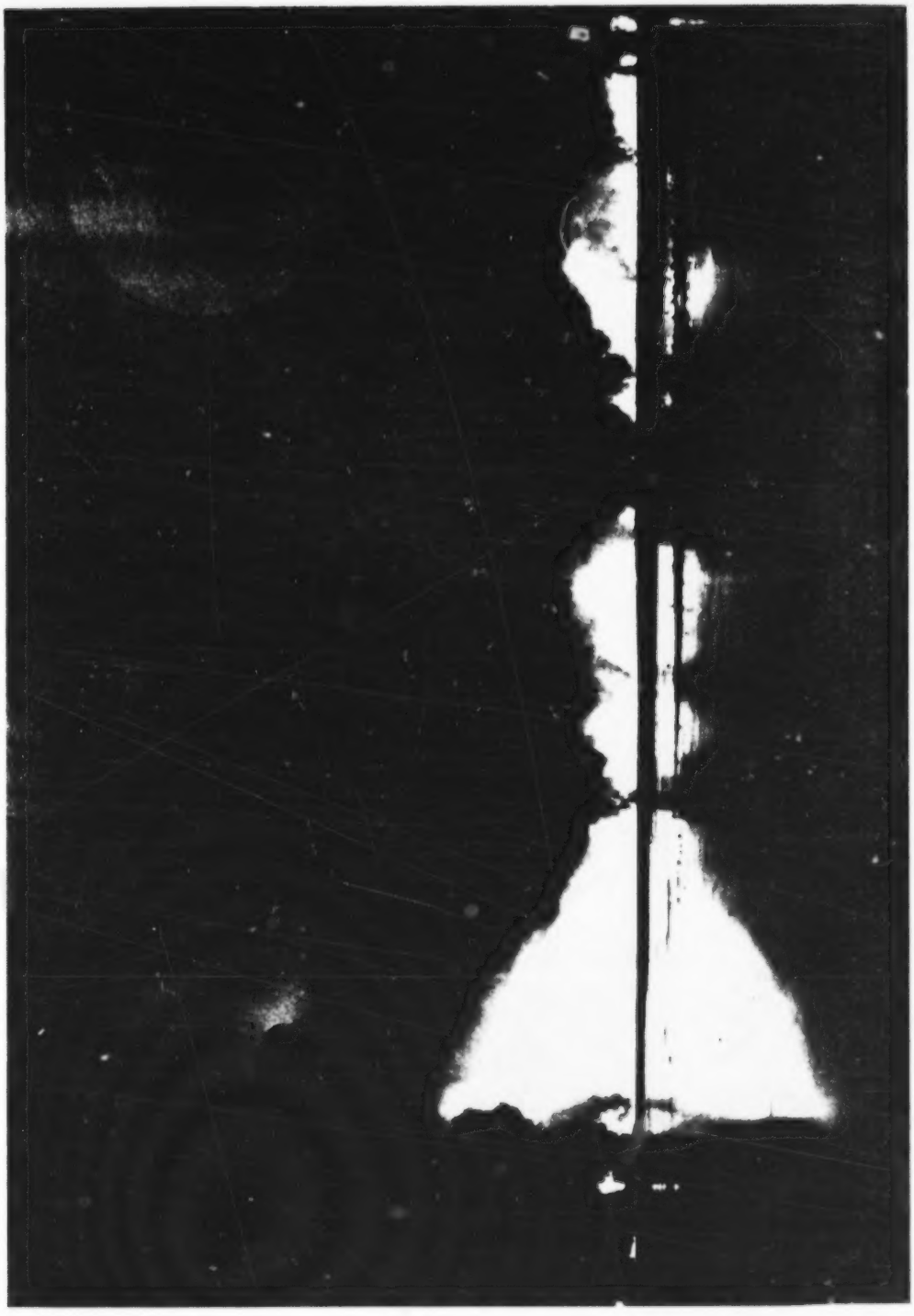
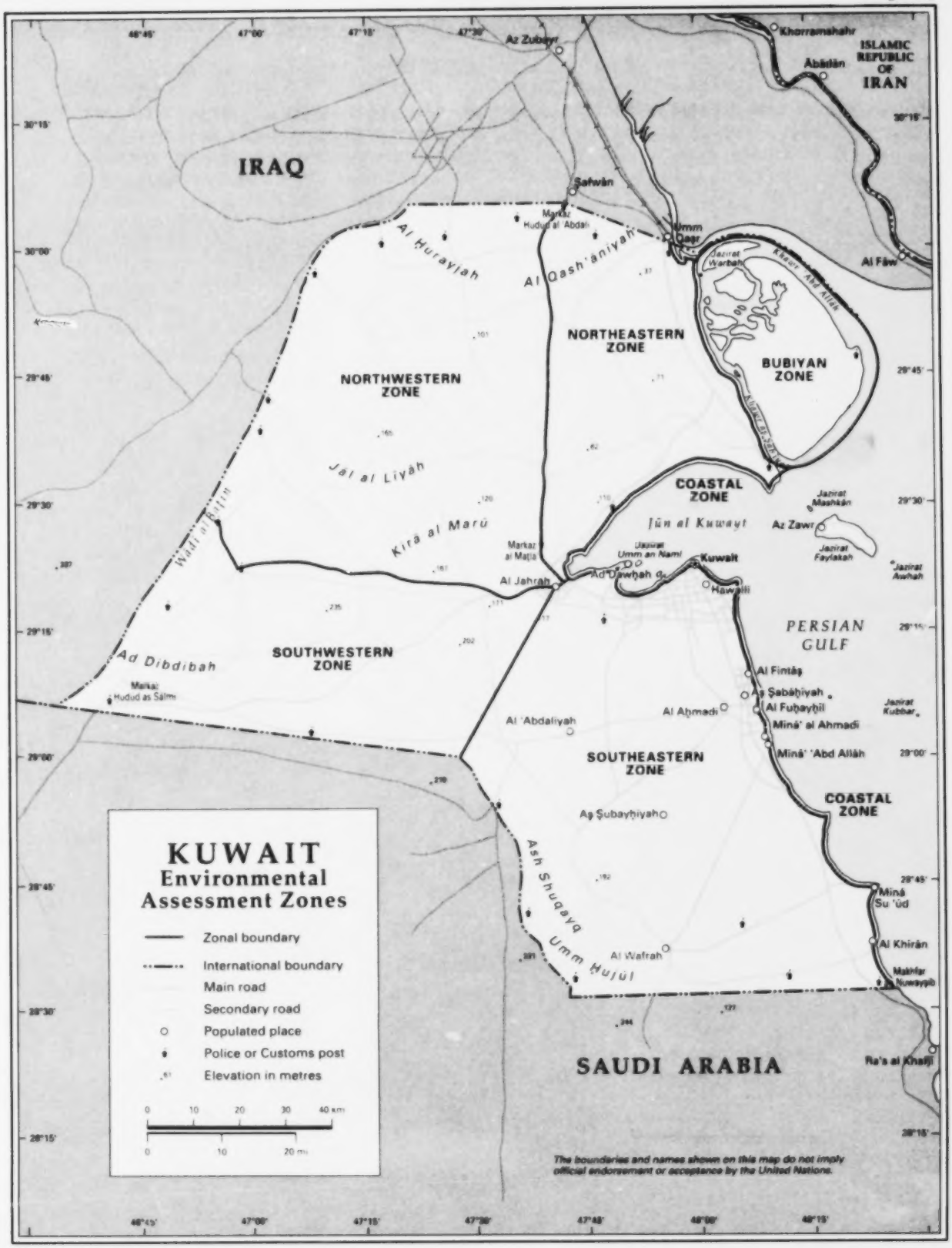




Map 3



MAP NO. 3631.11 UNITED NATIONS
APRIL 1991

Map 4

MAP NO. 3631.13 UNITED NATIONS
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V. AGRICULTURE, LIVESTOCK AND FISHERIES

A. Agriculture and livestock

1. Situation before 2 August 1990

212. Agriculture in Kuwait was never extensive since it is almost entirely dependent upon irrigation and thus on water availability. A 1966 soil survey carried out by the Food and Agriculture Organization of the United Nations (FAO) identified about 200,000 hectares as being relatively suitable for agriculture under irrigation but expressed caution on the long-term use of brackish water since it could lead to salt accumulation in surface layers. Wind and wind erosion also adversely affect crop growth in Kuwait so that the provision of adequate windbreaks and shelter-belts is essential.

213. The total area under cultivation in Kuwait amounts to less than 0.5 per cent of its total land surface. There are two main agricultural regions - Abdali in the north-east and Wafrah in the south. Some plantations and shelter-belt activities are in the Al Jahrah area.

214. In 1983, the total cultivatable area, taking factors additional to soils into account, was estimated at 150,000 hectares, of which 1,200 hectares were under fruit and vegetables. By 1985, this had risen to 4,500 hectares for vegetables and 2,200 hectares for fruit trees and timber. By 1987, there were 520 farms in the Abdali and Wafrah areas. This agricultural expansion was actively fostered by the Government through the provision of interest-free or low-interest loans, annual farm subsidies and financial aid in drilling wells for agricultural purposes. Government policy was to make Kuwait self-sufficient in vegetable produce. Intensive greenhouse crop production, therefore, rose dramatically during the 1980s, and in 1986, for example, 270 hectares produced 32,300 tons, while normal winter vegetable crops on all other land amounted to 74,500 tons. The main agricultural crops are cucumbers, dates, melons, onions and tomatoes. Before the occupation, Kuwait exported some vegetables to neighbouring countries. Irrigated alfalfa was also grown as fodder for livestock. There were feasibility studies to increase greatly the extent of irrigated date plantations. Little grain was grown, owing to the lack of irrigation water, although attempts were made to increase production.

215. Animal husbandry was traditionally the main activity of the rural population prior to the development of the oil fields. In recent years, the Government had done much to encourage livestock production by Kuwaiti citizens. Livestock numbers were estimated in 1988 at 26,000 cattle, 300,000 sheep, 20,000 goats and some 28 million poultry. Camels were also raised in areas adjacent to agricultural regions such as Wafrah. An additional 8,000 camels were estimated to be maintained by nomadic people. In recent years, cattle numbers, particularly Friesian dairy cattle, have risen sharply. Consequently, milk production increased from 9,000 tons in 1980 to some 50,000 tons in 1985 and was projected to reach 110,000 tons in 1992. The rise in sheep numbers from 21,000 in 1979 was a result of government

encouragement of wool production and to provide Kuwait with a more certain supply of meat less dependent on the vagaries of foreign supply. As part of this livestock programme, holding areas were set aside for livestock and, by 1987, there were 287 of these for cattle, 1,325 for sheep and 598 for goats. Poultry production was also encouraged so numbers rose during the 1980s, with egg production reaching some 477 million a year in the late 1980s.

216. Agriculture and livestock are looked after by the Agriculture Affairs and Fish Resources Authority, which in 1987 had 0.7 per cent of Kuwait's annual budget available to it. The Authority provided advice and extension services to local farmers. It also improved agriculture in Kuwait by helping farmers to expand the area under cultivation and by ensuring better seed quality. The Authority carried out research in various fields of agriculture and operated an experimental farm that included sections on poultry, dairy production and hydroponics. The Authority also administered the Kuwait Zoo.

2. Assessment of damage

217. Because of prevailing circumstances, the mission was unable to contact anyone from the Authority concerning agriculture in Kuwait. Nevertheless, the mission made a ground visit to Wafrah in the company of a smallholder from the area and agro-industrialists provided some information. On 22 March 1991, the mission overflew both the Wafrah and Abdali areas.

218. At the time of the visits, both areas seemed to have been abandoned. In Wafrah the Authority's office was empty. Most farms and smallholdings had suffered damage to greenhouses and to irrigation systems. Houses close to the border with Saudi Arabia had been occupied by Iraqi military to provide accommodation space. They had been vandalized. Water pumps, generators, tools and similar items had been removed. Much fencing had been wrecked. The mission visited a variety of farms, including dairy farms, poultry farms and a horse-breeding establishment. In all cases, equipment had been removed or smashed. The principal problem at present, however, is that the entire farming complex of Wafrah is heavily dependent upon irrigation water and it is clear that the irrigation system has not been working for some time. Perennial plants will need water soon if they are to survive. Many of the irrigated date palms will not last the coming summer without water. The mission overflight of the Abdali agricultural area suggested that conditions at Abdali were very similar to those at Wafrah.

219. No livestock were seen in either area on any of the mission's survey visits. Those who remained in Kuwait during the occupation sometimes took dairy cattle and other farm animals into their homes in an effort to save them. Sometimes this was successful and the mission saw two Friesian cattle being driven south in a pick-up truck. The mission was informed that most livestock had been removed or eaten during the occupation and that few remain today. Ruminants and other large herbivores are unlikely to do well in areas within the zone affected by the oil fire smoke plumes. Thus, those livestock that did survive the occupation may not survive the oil field conflagrations

that followed. New-born calves were reportedly dead in a few days. Only one camel was seen (at the northern end of the Wafrah road), in very poor condition with a flaccid hump. But in a mission overflight on the central western border with Iraq, a number of pastoralists were seen with camels, sheep and goats in what appeared to be good condition. No estimates of remaining livestock numbers at the time of the mission's visit could be obtained. It is safe to say, however, that the numbers must be very much less for all types than before the occupation.

B. Fisheries

1. Situation before 2 August 1990

220. While Kuwait, like other States in the region, derives most of its income from oil, the fishing industry continues to be of economic and cultural importance, and some communities still subsist on fishing.

221. Over the last five years, commercial fisheries have provided an annual yield of 5,000 to 6,000 tons. Offshore species once led in yields, but the importance of nearshore species has recently increased. Much of Kuwait's fishing industry is focused on the capture of these nearshore species. The shrimp (Penacus semisulcatus) and hammor (Epinephelus taurina) fisheries are particularly important. Kuwait is one of four countries in the region that have significant shrimp fisheries, with approximately 180 trawlers, most of them small, in operation.

222. The main fishing company in Kuwait is the privately owned Kuwait Fisheries Company, whose shrimp catch represents about 10 per cent of the total catch of the country. The company, with its facilities and pier located in the commercial harbour at Shuaiba, is self-contained. It owns a fleet of 20 trawlers (each 28 metres in length, with freezers and processing facilities), factory for processing and packing, workshops, communication facility, etc.

2. Assessment of damage

223. The mission visited the factory, which had been looted and vandalized. About a third of the plant's structure was heavily damaged and must be rebuilt. None of the trawlers was left; executives of the company claimed that they had been taken to Iraq. In fact, the company had no trawlers in its large docks.

224. Traditional fishermen were also severely affected. Their fishing boats were destroyed and most of them sunk, which the mission observed in its coastal inspection. Moreover, the terminal where their catch was sold was seriously damaged and needs major repair before it can become operational.

225. Fishing activities had ceased completely when the mission was in Kuwait. Not only had fishing boats disappeared but the sea mines continued to pose dangers. Even if these obstacles are overcome, other problems still remain. The fisheries industry will also suffer for some years from the negative consequences of the oil-slick in the Persian Gulf, which may result in the killing or smothering of fish, shrimp, plankton and other marine eggs and larvae, as well as the destruction of spawning grounds (in laboratory tests, the mortality of fish eggs in surface oil film was between 70 and 100 per cent). This is likely to disturb the life cycle of fish and shrimp in the Kuwaiti waters and hence will reduce the country's capacity for seafood production.

C. Illustration

Page

Fishing boats and dhows destroyed by the occupation forces 69

VI. ELECTRICITY, TRANSPORT AND COMMUNICATIONS

A. Electric power and gas

1. Situation before 2 August 1990

226. Electricity in Kuwait was supplied from five major power stations. One of these is located at Zawr (2,511 megawatts), two at Shuaiba (1,134 megawatts) and two at Doha (3,558 megawatts) (see map 5). A sixth but considerably smaller power station (195 megawatts) is located at Shuwaikh inside Kuwait City. This station was commissioned in the 1950s. The other stations are comparatively new, having been commissioned in the 1980s.

227. The power stations had a cumulative installed capacity of 7,400 megawatts, meeting a peak load of about 4,000 megawatts in 1990. Electricity generation is based mainly on oil-fired steam turbines. Only a small part, 400 megawatts, is based on gas turbines and provides stand-by capacity.

228. Each power station has a desalination plant. When fully operational, these plants had a combined desalination capacity of close to 250 million gallons of water a day.

229. The power is transmitted on 300-kilovolt and 132-kilovolt transmission lines from the power stations to substations adjacent to the consumption centres in Kuwait City and other areas. Several 300-kilovolt transmission lines run from Zawr via Kuwait City to Doha. The total length of these lines is 335 kilometres. The 132-kilovolt overhead transmission network has a total length of 1,150 kilometres. The length of the 33-kilovolt overhead network from the substations is 1,330 kilometres. The underground cable network consists of 3,500 kilometres of oil-filled cables and 20,000 kilometres of lower-voltage cables.

230. A large number of substations transform and distribute the power to the consumers. There are 13 substations on the 300-kilovolt level and 295 on the 132 and 33 kilovolt levels. There are approximately 7,000 substations on lower voltage levels.

231. Before 2 August 1990, the electricity system in Kuwait had a tremendous generating capacity. It had a variety of transmission and distribution alternatives, which made the supply extremely reliable. The system had modern equipment and was monitored and controlled from a remote-control centre in the National Control Centre building. Its staff at that time had a strength of 11,000 employees.

232. The administration buildings for the Ministry of Electricity and Water are located at Kuwait City, as are the central stores, workshops and transportation centre. A modern computer centre was housed in a separate building.

233. Part of the energy used in buildings and residences has been provided by gas. Although most of the domestic supply of gas was bottled, a gas distributor pipeline system supplied institutions such as schools, hospitals, military camps, government buildings, catering facilities and bakeries. Gas was delivered from KOC and distributed by the Ministry of Energy and Water. Most of the distribution network is through underground pipes in Kuwait City.

2. Assessment of damage

234. The mission visited and inspected all the major stations principally responsible for power production.

235. The Doha East and Doha West power stations were blown up and totally destroyed. Six of the eight big oil tanks at these stations have also been destroyed. Other damage is less severe and can be repaired. None the less, these two stations need reconstruction of their control rooms and oil tanks and repair of other less damaged equipment before they can become fully operational. Doha West power station could run partially despite the destruction of the electrical control room. The desalination plants have suffered no apparent harm.

236. Severe damage also occurred at the Shuwaikh power station. Because of its relatively advanced age and low generating capacity, there is a possibility that the station will have to be abandoned, as will its desalination plant.

237. The Zawr power station and desalination plant was found undamaged. It could be set in operation as soon as the transmission lines are repaired. The Shuaiba South and North power stations and desalination plants have suffered severe damage to their transformers, but little damage has been inflicted upon the stations themselves. Once the damaged transformers are replaced and minor damage repaired, the stations can become fully operable again.

238. Of the original 7,400 megawatts generating capacity, it is envisaged that 3,000 to 3,500 megawatts could be reinstated once the transmission lines are repaired. This generation capacity appears to be sufficient for meeting the expected load in the current situation.

239. There is however an important caveat. Since the system has been shut down for several weeks and has suffered from lack of maintenance, the re-establishment of a stable power supply may take several weeks. Re-establishment of full capacity will take much longer, probably two years at the least.

240. The total damage to the power stations is assessed to be in the order of 5 per cent of the replacement value of existing plants. This assessment excludes the value of the Shuwaikh station, because of its age.

241. The damage to transmission lines appears to have been caused by gun-fire. It caused thousands of cuts to conductors and also damaged isolators. A very small number of towers also suffered damage.

242. The conductors are already in the process of being repaired and partly replaced. This repair will be completed in a few weeks. Some lines had, in fact, been brought into operation by the time the mission arrived. The repair costs are assessed to be in the order of 5 per cent of a completely new line transmission system, including towers.

243. It must be stressed that the current repair work is an emergency measure. It may be necessary to change the conductors at a later date, but this can not be decided upon until the lines are tested. Should change be required, the damage assessment would rise considerably.

244. The mission inspected five out of the six main 300-kilovolt substations that were reported to have been damaged. The damage ranged from the total destruction of all the transformers to minor debris penetration. Little harm was observed to other parts of these substations.

245. Some 25 of the 295 substations, on the 132-kilovolt and 33-kilovolt level, were reported to have suffered damage. The mission inspected eight of these. Here again, the damage extends from, in some cases, total destruction of the whole station, including buildings and structures, to minor debris penetration in others.

246. The telecommunication equipment for most of the substations has been put out of commission. Consequently, the stations cannot be operated by remote control from the control centres, but have to be operated manually from the control rooms in each station. The majority of substations throughout the country on lower voltage levels seem to have experienced very light damage. None of the stations observed or inspected was visibly affected. The total damage to these substations is assessed to be in the order of only 5 per cent of all their replacement value.

247. The comprehensive underground cable network cannot be fully tested until power is restored. There seems, however, to be moderate damage, although it has not been possible to investigate the effect from tanks and other heavy vehicular traffic, as well as the digging of trenches and bunkers. In addition, the lack of maintenance on the oil cables for seven months could affect the operational efficiency of the network. The total damage to the underground cable network, while difficult to assess, is probably less than 5 per cent.

248. Despite the damage inflicted upon the substations and the underground cable network, the system is so comprehensive and resilient that power supply to consumers may be re-established relatively soon, although some areas will not have power restored until adjacent substations have been repaired. Reinstatement of the whole system could take a year or more.

249. The main loss to the administrative buildings is attributable to extensive ransacking and vandalism. In the premises visited, all computers and office equipment and supplies had been taken. The new computer centre at the Kuwait Ministry of Electricity and Water had been ransacked and stripped completely of all its equipment and furnishing. Structural damage is relatively moderate, except for some fire damage to the main office premises.

250. Three quarters of the contents of the main store have been lost. Removal of spare parts and equipment is reported to have been systematic. Mission members were told that the looting started in early August and lasted for four months. The loss from the main workshop was said to be almost total. Out of 1,200 government cars (light vehicles), 900 were removed; of 800 hired cars, 600 were stolen (more than four fifths); and 85 per cent of heavy equipment such as cranes, trucks and loaders had been removed.

251. The total loss from looting of stores, workshops and garages is in the order of 70 to 90 per cent. Until new equipment and supplies are provided, there will be a considerable obstacle to the smooth operation of the electricity system.

252. The Ministry of Energy and Water informed the mission that no visible damage has been observed to the gas-distribution pipeline network, which is mainly underground. It has however been without maintenance for eight months. Since there was still no gas supply at the time that the mission was in Kuwait, the mission was unable to test for leakages.

253. The damage inflicted on the entire electricity system is assessed to be in the order of 5 to 7 per cent of the value of a new system, including the reconstruction of stocks, transport equipment and other facilities. Presuming that the cost of a new system, such as that of Kuwait, would amount to close to $18 billion, the cost of re-establishing the system to a pre-invasion status would be in the order of $0.9 to $1.3 billion.

254. A complete return to normalcy could prove more costly and might exceed the upper limit. Additional repairs might be necessary when the system is fully tested, in particular to the transmission lines and oil-filled cables.

255. A serious problem may be experienced in the operation and maintenance sector owing to a seriously depleted stock of spare parts, inadequate transport facilities and a vast shortage of human resources. Of 11,000 employees in the sector before the invasion, only around 1,000 are left today. The majority of the engineers, technicians and other professionals who played so crucial a role in the daily operation of the system have left Kuwait.

256. Virtually every sector of civic and social activities, such as water supply, sewerage, health care, education and water production is sustained by electricity. Its temporary absence in Kuwait has considerably retarded the re-establishment of normal life. While power to supply current needs can be re-established in a matter of weeks, it is estimated that to restore the system as it was before the invasion would take at least two years.

B. Transport

1. Roads and bridges

(a) Situation before 2 August 1990

257. Kuwait has a well developed system of motorways, ring roads and city streets serving all urban areas, with a total of nearly 300 kilometres of multilane motorways and 3,500 kilometres of other paved roads. Three dual-carriageway motorways lead to the borders with Saudi Arabia and Iraq. All roads are sealed with asphalt and the motorways are constructed to very high standards. The system includes interchanges and flyovers at each intersection of the major roads. The motorway system was in the final stages of completion in mid-1990.

258. The Roads and Bridges Department has five divisions: four are responsible for the north, south, west and central areas of the country, while the fifth is devoted to motorway maintenance and road testing and research. All road and bridge construction, as well as nearly 80 per cent of the maintenance work, is handled by contract. Many of these contracts were being fulfilled at the time of the invasion.

259. Kuwait City had most of its intersections controlled by traffic lights, although most were uncoordinated. Some major radial and ring-road intersections were coordinated for "green wave" operation by linked automatic controls.

(b) Assessment of damage

260. The mission inspected Kuwait City streets and main radial ring and roads as well as the Al Safr Motorway and Al Fahaheel Expressway to the Saudi Arabian border. The inspection of the Jahrah motorway and major north road to Iraq was done by aerial survey. Nearly 15 kilometres of the dual carriageway, close to the border with Saudi Arabia at Nuwaysib has been ripped and trenched, and 5 kilometres on the main highway west of Jahrah has been severely damaged (see map 6). Extensive resheeting of the asphalt surface will be necessary and the damaged sections on the south and west highways will require complete reconstruction. It is possible that the highway leading north and almost half of the city's ring/radial system will also require sections of pavement overlay. There has been some random, but repairable, cratering from shell-fire, tanks and bombs on the motorways and substantial cracking of the pavement and stripping of asphalt from overweight traffic. However, over all the system appears to have stood up well to the unusually heavy loads, which is a reflection of its high standard design. The long-term effect on the road pavement and subgrade from the abnormal loads can be assessed only after closer and more detailed inspection and analysis of samples.

261. Except for the surface course, the city streets and arterials are in good condition and will need little rehabilitation except for the removal of obstructions (such as 1,800 broken down or stripped vehicles) and replacement of signs. There has been substantial destruction of paved footpaths and median strips by the invasion forces to provide materials for strengthening fortifications. This is especially noticeable along the waterfront and has also led to the destruction of roadside walls.

262. Two 30-metre spans of the multispan concrete Bubiyan bridge have been destroyed, but they can be replaced, though at considerable cost. Moderate-to-severe structural damage has occurred to two interchange prestressed concrete bridges close to Jahrah and one interchange bridge close to Ahmadi. There is little other damage to most other interchanges and bridges except for some pocking of concrete by bullets and shells on the north and south expressways. The damage inspected of this type was minor and repairable.

263. The complete road system is however handicapped by a lack of regular maintenance. The nearside lane and the formed shoulder on multilane roads are covered in sand. Many culverts are blocked, road markings have faded and a significant amount of the road "furniture" (such as signs and guard rails) is damaged or missing.

264. The mission also inspected district offices and depots (Nos. 2 and 3), the Road Research Laboratory, the Bridge Maintenance Office and depot, the Road Maintenance stores and depot and the Department's asphalt plant complex. In all cases the depots and laboratories had been stripped of all equipment and materials, spares, vehicles and office furnishings. Structural damage was minimal and all permanent structures are sound.

265. The Department's asphalt complex consisted of an asphalt plant and an asphalt recycling plant with a combined capacity of 200 tons an hour, a bitumen emulsion plant and a concrete-coating plant. All four plants had been removed in their entirety during the occupation period. There was some minor structural damage from bullet- and shell-fire and the prefabricated plant control building had been partially destroyed. It is reported that at least two asphalt plants belonging to contractors had also been removed.

266. The Road Research Laboratory contained much state-of-the-art equipment and testing systems. All had been removed as had all furnishings. The structure itself was sound.

267. All manuals, books, documents, plans and data had been either taken or vandalized at all locations.

268. An inspection was also made of two construction areas. The South Surra Residential Estate was in the early stages of construction in August 1990 and preliminary excavation had begun. All of the contractor's plant was removed and the site offices destroyed. As the construction area was also used by the invasion forces for trenches and bunkers, the excavation work was destroyed.

269. A contract had been concluded in early 1990 for the dualling of the Mina al-Wafra road and the contractor had been mobilized. An inspection showed that all the plant had been removed and the site offices destroyed.

270. The mission undertook a general inspection of the traffic-light system and noticed that many automatic traffic-light controls had been removed and others damaged. It was noted that some poles were damaged and heads removed. A random sample carried out by the mission indicated that 10 per cent of all controls and 5 per cent of all heads had been removed or destroyed but that figure could be an underestimation as the complete damage can be ascertained only once power is restored to the whole system.

271. The Kuwaiti authorities have compiled a list of plant and other items that belonged to the depots and sites visited by the mission. These lists have been examined and the items listed are considered reasonable for the standard of the facilities visited.

272. The main loss in this sector has been of construction and maintenance equipment belonging to the government and private contractors, as well as that of road-building material production equipment and testing and research equipment. The major portion of the basic structure of the road and bridge system is on the whole sound, but does require immediate maintenance and minor, but essential, repair.

2. Ports

(a) Situation before 2 August 1990

273. Kuwait has traditionally been an important centre for ship movement and marine activities. It has three commercial seaports, Shuwaikh, Shuaiba and Doha, all under the Ports Public Authority. Shuwaikh, established in 1960 is the oldest commercial port. It has 21 berths with a total length of 4 kilometres. In 1986 a total of 1,196 ships docked at Shuwaikh, discharging 3 million tons of goods. The port has two berths reserved for container loading, with a container inspection station on 22,000 square metres. A ports complex was constructed recently. It has Ports Public Authority offices, agents offices, a multistorey carpark and other government offices. The complex, which cost $30 million, had not yet been officially opened at the time of the invasion.

274. The second largest port is the Shuaiba commercial port, built in 1967. This port has 20 berths plus two docks for small ships, with a total length of 4 kilometres. Shuaiba port also has a new container terminal (1982) with four deep-water (14 metres) berths. The terminal possessed cranes and specialized container-handling equipment. It had a maximum handling capacity of 400,000 twenty-foot equivalent units (TEU) containers a year. The port mainly serves the Shuaiba Industrial Area and the oil refineries.

275. The third commercial port is at Doha, commissioned in 1981 for small coastal ships carrying light goods. It has 20 small berths, each 100 metres long, with a draft of about 4 metres.

(b) Assessment of damage

276. The ports of Shuaiba, Shuwaikh and Doha were inspected by the mission.

(i) Shuaiba Port (see map 7)

277. Shuaiba Port has suffered extensive damage to its loading equipment and all moveable equipment has been looted. The port was in very limited operation at the time of the visit of the mission.

278. The road access to the port is undamaged except for moveable obstructions. The main channel access has been checked for mines and found to be safe.

279. Four ships and barges had been sunk in the barge harbour and small boat basin. Four belonged to the Ports Public Authority and one to Iraq. At the time of the mission's visit one of the vessels still had to be removed. In the main harbour a ship moored at berth No. 12 has been gutted by fire and blocks the berth, while a coastguard ship is lying damaged at berth No. 11. The small boat harbour is polluted with oil to a depth of one inch on the surface.

280. Most warehouses are structurally intact but have been completely looted. There is moderate structural damage to a seamen's recreational building and an adjacent workshop as well as to a firefighting building close to the small boat harbour. The United Fishing Company's office and processing plant has sustained minor structural damage, mainly to the roof, and severe structural damage has been incurred by the offices of another small fishing company. Outside the port area there is moderate structural damage to the main Ports Public Authority offices. This can be repaired.

281. All buildings, warehouses, workshops, stores, offices, the communication tower, the firehouse, security buildings, gate houses, Shuaiba Area Authority buildings and contractors buildings have been stripped of all moveable equipment and there is extensive damage to furniture and fittings. Most of the files and records are also missing or destroyed.

282. There is severe damage to the main bogey wheels of the container gantry crane at berth No. 18. Repair will be difficult and expensive. There is damage to the controls of some of the other gantry and mobile cranes but the full extent could not be determined. All the original forklift units are damaged or missing.

283. Two cement-loading units at berth No. 8 have been destroyed. The sulphur conveyor and loading unit is moderately damaged and burnt.

284. Most open storage areas, including the empty container park, the container inspection area and the main harbour open storage area are relatively undamaged, with some minor cratering from shells or rockets. There is also some minor damage to the barge harbour wharf.

285. At the time of the visit of the mission, Shuaiba Port was in partial operation although no loading or unloading equipment was operable.

286. No information was available from the Ports Public Authority during the visit on the number or type of ships that were berthed in the harbour on 2 August 1990 and are now missing.

287. A list of missing equipment at Shuaiba Port has been submitted by the Ports Public Authority. This has been checked for reasonableness and the total estimated cost of over $70 million is considered to be in the correct order.

(ii) Shuwaikh Port (see map 8)

288. Shuwaikh Port has suffered severe damage to its loading equipment, offices and closed storage areas. The main channel and many berths are blocked and the port is at present inoperable.

289. The road access to the port is undamaged and all roads within the port are clear except for obstructions, barbed wire and debris.

290. The channel, main port and other basins are being cleared of mines and other obstructions, of which there are an unknown number.

291. There are at least two boats sunk in the small boat harbour as well as a number of ships in the following berths: berth No. 7: a very large cement factory ship; berth No. 8: two ships; and berth Nos. 13 and 16: one ship each. The cement ship in particular will be very expensive to move. There are numerous small craft sunk in the coastguard and fire-fighting harbour. Cranes have been toppled into the harbour at berth Nos. 11 to 15 and 17.

292. As the harbour was still being checked, the full extent of the blockages could not be ascertained.

293. The administration offices close to berth No. 5 have severe structural damage and will have to be demolished. The warehouse near berth No. 11 and the livestock terminal (berth Nos. 19 and 20) both have moderate structural damage. The warehouses near berths 2 to 5, the marine offices and the customs, health and anti-pollution offices all have minor structural damage. All these buildings, with the addition of the main administration block, the stores, agent offices, pilotage, recreational buildings and container terminal offices have been ransacked and looted of all equipment.

294. The new Ports Public Authority complex at the port entrance has minor structural damage to the wall façade but appears structurally sound. The inside of this complex was not inspected. It is understood that it has not yet been fitted or furnished.

295. Most buildings in the Kuwait Shipbuilding and Repair Yard Company have been looted and burnt, in particular the main offices. The cranes and repair docks appear sound, although all other equipment is missing and presumed looted. A close inspection of this area was not possible because of security considerations.

296. Twelve gantry and straddle cranes have been felled and are beyond repair. Eight gantry and straddle cranes are damaged or burnt; it is unlikely that more than six can be repaired. All other loading equipment, including floating cranes, mobile cranes and forklifts, are missing.

297. The flour mill unloading intake is moderately damaged (50 per cent); repair is possible.

298. Most open areas appear undamaged except for some minor cratering from shells and rockets and general debris. There is some damage to the wharf in the small craft harbour and minor burning of mooring timbers in other areas. The open storage areas appear undamaged although the container storage and truck park is full of over 1,000 stripped, damaged and gutted trucks, tankers, cars and other vehicles.

299. No information was available from the Ports Public Authority on the number or type of ships that had been berthed or moored at Shuwaikh Port on 2 August and are now missing. At the time of the mission Shuwaikh Port was in the process of being cleared of explosives and mines. The Ports Public Authority had not therefore been able to carry out an inventory of equipment and material loss.

(iii) Doha Port

300. Doha has not yet been fully checked for obstructions, although no mines have been reported. At least six ships (dhows) have been sunk: there may be others. One warehouse has been demolished, all other buildings are structurally sound. All buildings had been ransacked and plundered. There was no loading equipment on the wharves except for some small mobile cranes. The road access to Doha Port is undamaged as are all the internal roads.

301. The Ports Public Authority has not yet carried out an inspection of the Port and therefore no equipment inventory is available.

302. In summary there appears to have been moderate to severe damage at Shuwaikh, moderate damage at Shuaiba and minor damage at Doha. The main areas of damage are obstructions in the harbour and damage to loading equipment. When the harbours have been cleared and power restored, however, all ports could quickly resume partial operation.

303. The Ports Public Authority has estimated that the total losses in this sector will be around $1 billion. Considering the damage to the infrastructure of the ports and the equipment loss, this figure appears to be in the correct order of magnitude. There will also be loss of revenue while the ports are being restored.

3. Kuwait International Airport

(a) Situation before 2 August 1990

304. Kuwait International Airport, which commenced operation in 1961, is situated on the west side of Kuwait City. It has two runways (3,400 metres and 3,500 metres) and is capable of accommodating all modern international aircraft. It has two terminals: terminal No. 1 is the older and is average by modern standards; terminal No. 2 was recently completed at a cost of $126 million and possessed the latest equipment and facilities for the processing of passengers and automatic baggage handling, including a modern security-checking system. Terminal No. 2 has a total of 12 gates with direct access to aircraft and individual departure lounges. Both terminals have adequate ground access gates. The terminals also accommodated shops, banks, VIP lounges, a duty-free area, cafeterias, a prayer room and staff facilities.

305. The airport had a modern system of navigational aids and aircraft control and a modern fire and emergency service. The Airport Transit Hotel (200 rooms) is located on the airport perimeter. In June 1990 the airport had an aircraft movement of 2,944, a passenger movement of 57,700 and a freight movement of 4,145 tons incoming and 3,294 tons outgoing.

(b) Assessment of damage

306. The Kuwait International Airport and all its facilities were inspected by the mission. It was noted that extensive looting of all equipment has been carried out. This includes navigational and communication equipment, runway lighting, television monitors and computer terminals, X-ray machines, stores and shops, furniture and fittings. All of the mobile equipment and vehicles are missing. There was also extensive damage to some structures by fire and explosives (see map 9).

307. Terminal No. 1 has been severely damaged both by fire and explosives. The single storey main steel-frame structure is seriously buckled in places. This, and the prefabricated nature of the terminal, will require the demolition of the terminal. Although much of the equipment and fittings has been removed, there are a significant number of items that could be salvaged.

308. Terminal No. 2 is a reinforced concrete structure and, while there has been moderate fire damage, the terminal can be rehabilitated. There has been extensive looting on the ground side, including the removal of one complete check-in counter and severe burning of one section, causing damage also to the services located in the ceiling. On the air side, most airbridge gates have

been damaged but can be repaired, although six have been badly burnt. The plate glass, fittings, indicator boards and monitors and antiquities in the display cases have been largely destroyed or removed.

309. There has been some fire damage in the arrivals hall, including the complete gutting of three baggage conveyors. This fire also destroyed the main electrical and control cabling in the ceiling. The VIP lounges have been completely stripped. Other areas that have been damaged and completely plundered include the meteorological office, the briefing office, the marshalling office and three stores. There has been about 20 per cent damage to the plant equipment in the basement. All airport offices have been completely robbed of equipment, furniture and furnishings, including carpets and curtains. The total damage to the terminal is estimated at 20 per cent of the total cost of the terminal.

310. Both the Ministerial and Emir VIP lounges have been completely gutted by fire and explosives; these will have to be rebuilt.

311. There has been damage to and pillaging of equipment at all radar installations to the extent that all are at present inoperable. The search and surveillance radar installation has moderate structural damage from shell-fire. Repair may be possible but it needs more detailed inspection. There has been about 20 per cent equipment damage to the primary radar but the structure is undamaged. All equipment has been removed from the ground radar installation, but here also the structure is undamaged.

312. While the main control tower is structurally undamaged, its main control cabin was severely burnt and all equipment destroyed.

313. The radar and communications control tower, which contained all radar and very high frequency (VHF) control equipment, has been completely gutted by fire. Equipment that has survived theft has been destroyed. It is probable that this tower will have to be demolished.

314. There has been damage to one runway (500 metres of runway 33L) by cluster bombs. This section is at present unusable, although it can be repaired.

315. Most of the lighting system was removed from both runways, including runway lights, approach lights, threshold stop bars and handling point lights. Other destruction included that of two integrated landing systems (ILS), two glide path and two localizer navigational lights and markers and an electrical substation. The local and Wafrah visual omni-directional radar (VOR) navigational (radio) installations were also destroyed as was a non-directional beacon (NDB) navigational installation. The airport security building was also severely damaged.

316. Two airplanes were destroyed on the tarmac, a Kuwait Airforce transport plane and a British Airways Boeing 747. There is some consequent damage to the western apron.

317. Over all, the airport has suffered extensive equipment loss and damage as well as moderate structural damage from both fire and shelling. Most of the runway, taxiway and tarmac areas are undamaged and the main terminal can be rehabilitated. There will need to be extensive repair and replacement of navigational and central equipment before the airport can begin basic operation.

4. Transport services

(a) Surface transport

(i) Situation before 2 August 1990

318. Public transport in Kuwait is run by the Kuwait Public Transport Company. It provides passenger transport services, student transport services, services to Saudi Arabia and other countries; maintenance and repair of most government-owned cars, except for the Ministry of Defence, and management of the ferry services.

319. In early 1990 the Kuwait Public Transport Company had 1,280 school buses, 753 public transport buses and 148 buses for special services. About a third of these buses were air-conditioned and each had around 40 seats on the average. The public transport buses ran on nearly 60 routes throughout Kuwait, carrying nearly 300,000 passengers a day. In addition, the Kuwait Public Transport Company was responsible for the repair and maintenance of 4,200 vehicles used by the Ministry of the Interior, including all the police vehicles and a further 2,850 vehicles used by other government ministries.

320. The Kuwait Public Transport Company operated two main public transport terminals and various bus turn-around stations at the end of some routes. The new main terminal, built at a reported cost of over $5 million, has 18 bays, a small garage and a large terminal building with shops and cafeteria. The old terminal also contains the main office block of the Company.

321. The Kuwait Public Transport Company has six garages for the maintenance and minor repair of the public transport fleet and government vehicles. It also has a new main workshop and training centre in its Technical Affairs Division in Sulaibiya. The workshop and stores, covering a 15,000-square-metre area, contained state-of-the-art repair equipment, including that for tyre retreading, engine boring and electronic tuning. The facility also had a dormitory block capable of accommodating up to 500 staff.

322. The marine section of the Kuwait Public Transport Company operated the shuttle passenger service between Faylakah Island and Ras al-Ard, using modern hovercraft and car ferries. The company had a total fleet of 11 ferries and carried over 570,000 passengers and nearly 10,000 vehicles each year. It had its main marine offices at the Ras al-Ard terminal.

323. The total number of vehicles registered in Kuwait in 1989 exceeded 560,000; 75 per cent of these were private cars.

(ii) Assessment of damage

324. The mission inspected the Kuwait Public Transport Company main offices, both bus terminals, two of the six garages, the main workshop and training centre, two bus receiving depots and the Ras al-Ard ferry terminal. Without exception all buildings had been plundered and vandalized. Equipment and furnishings were removed or damaged and much of the records and operating data was lost.

325. The main workshop and stores and all garages and terminals were also completely and systematically stripped of all equipment, machinery and spares. The loss at the main workshop was immense as the facility was highly capitalized with high-standard equipment and tools and a large stock of spares.

326. In the main Kuwait Public Transport Company offices, about two thirds of the equipment and nearly half of the furnishings were missing. The main computer, however, appeared to have suffered only minor damage. All facilities were found to be structurally sound.

327. Of the total vehicle fleet maintained by the Kuwait Public Transport Company, less than a fifth remains, the majority of it damaged or stripped of parts. This constitutes a loss of over 7,500 buses and other vehicles, including nearly the entire police car fleet. The remaining vehicles, heavy machinery and workshops have suffered severely from a lack of maintenance during the period of the Iraqi occupation.

328. The marine terminal has been looted of most of its equipment and vandalized, but it is structurally sound, as are the berths and pier. The three car ferries appear to be only slightly damaged but the whereabouts of seven of the eight other passenger ferries are unknown. The eighth ferry was discovered during a mission inspection of Shuwaikh Port, but its condition could not be assessed. The total cost of the seven missing ferries is reported to be in the order of $4 million.

329. All of the Kuwaiti Petroleum Company's fleet of 22 oil tankers were reported to have been taken from Kuwaiti waters at the time of the invasion and therefore remained undamaged.

330. Losses to the private truck fleet could not be ascertained as the majority of owners were absent from the country. However, it was indicated that they are likely to be of a similar order to that of the government sector, i.e. about 80 per cent.

331. Similarly, the total losses of private cars could not be ascertained. It is known that many cars were extensively looted, especially those that had been parked in the open. The mission saw thousands of stripped and damaged cars, many unrepairable, on streets, roads, parking lots and open spaces in

Kuwait City and during visits to outlying areas. At Shuwaikh Port alone it is estimated that over 1,000 vehicles had been stripped and dumped in the truck park. Kuwait authorities estimate that over 50 per cent of the 420,000 private cars were either taken from the country, stripped or destroyed. Although an estimate of the total cost of damage to this sector has not been made, the probable loss in private and public vehicles alone could be of the order of $5 billion.

(b) Kuwait Airways Corporation

(i) Situation before 2 August 1990

332. Kuwait Airways Corporation was formed in 1954 and by 1990 had a fleet of 21 planes that carried more than 1.6 million passengers and over 45,000 tons of freight a year. The airline operations were world wide, with scheduled flights to the United States, Europe, South-East Asia as well as all areas in the Gulf region.

333. The airline was supported by a full infrastructure base in Kuwait, including engineering and maintenance for all aircraft, crew training in simulators, catering and a fully computerized reservation system. The engineering infrastructure included wide-bodied and small plane hangars, an engine overhaul workshop, an engine test cell, a safety training centre and a catering unit with a production capacity of 20,000 meals a day. By July 1990, the fixed assets at cost totalled $1.3 billion, of which $840 million represented aircraft, $210 million spare parts and $95 million equipment, furniture and vehicles. The total number of employees was around 6,000.

(ii) Assessment of damage

334. An inspection was made of the Kuwait Airways Corporation installations at Kuwait International Airport and the main office at Kuwait (Kuwait Airways Building). The Kuwait Airways Corporation also has many branch sales offices in the city. These were not visited, although it was reported by the Kuwait Airways Corporation that many of them had been ransacked and vandalized.

335. The mission inspected every installation in the airport. Without exception all installations had been completely plundered and many vandalized. The loss of equipment and spare parts is of staggering proportions.

336. The main administration building and the small aircraft hangar have both been destroyed by fire and explosions. There is serious structural damage to the old technical store and workshop and it is unlikely that they can be repaired. There is moderate (20-25 per cent) structural damage to the main wide-bodied hangar, which can be repaired. The main damage is to the ceiling and roof areas. The catering building has moderate to severe structural damage and will probably have to be demolished.

337. The incoming and outgoing cargo building and the short-term (i.e. perishable) cargo shed have all been looted and burnt. The structural damage is severe and repair does not seem possible. All other buildings are structurally sound or have suffered minor damage, mainly as a result of looting.

338. There has been almost total removal of equipment, furnishings, materials, spares and documentation in all areas. It is the estimate of the mission that over 90 per cent of all equipment, spare parts and materials are missing or have been damaged beyond repair. In particular all technical stores and workshops have been completely cleared, all of the more than 500 computer terminals as well as all outside wheeled plants (vehicles, moveable stairs, etc.) are said to have been removed by the invasion forces.

339. Both the aircrew training building and the other staff training centre have been cleared of most equipment, including sophisticated communication and presentation equipment in both centres. While the Boeing 727 simulator in the crew training centre was completely dismantled and removed, the Boeing 747 simulator remains comparatively undamaged.

340. In the printing section all the equipment has been removed. The Kuwait Airways Corporation reported that the equipment was in mint condition and was one of the best printing systems in Kuwait; the size of the print shop and the equipment manuals still remaining appear to support this assessment.

341. The loss of all maintenance equipment and spares will compel the Kuwait Airways Corporation to go outside Kuwait for routine and essential maintenance on its fleet.

342. The mission was informed that 15 aircraft were appropriated by the invasion forces - 2 Boeing 767, 5 Airbus 310, 3 Airbus 300, 2 HS125 and 1 Boeing 727. In addition to these aircraft from the regular fleet two Gulf Stream G-III are also reported as having been taken. The total replacement cost of these aircraft has been estimated by the Kuwait Airways Corporation as being in the order of $600 million.

343. The Kuwait Airways Corporation has suffered a tremendous overall loss in aeroplanes, equipment, spares and materials, the majority of these items being missing rather than destroyed. While the structural damage to buildings is significant, it does not approximate the equipment loss, which has been estimated by the Kuwait Airways Corporation to be in the order of $250 million.

344. An inspection was also made of the Kuwait Airways Corporation building at Kuwait City. Because of military restrictions, only the first 3 floors of the 12-storey building could be inspected. These floors contained the ticketing, sales and promotion areas. There has been moderate-to-heavy looting of all areas and offices, including computer terminals, furniture and fittings. The top five floors could be seen to be extensively burnt and the interiors gutted. The top floor contained the main computer mainframe for the reservation system, and this almost certainly could not have survived. The

building however would appear to be structurally sound and more detailed inspection would determine whether it can be rehabilitated.

C. Telecommunications and postal services

1. Situation before 2 August 1990

345. The telecommunication services in Kuwait were state of the art. The services included national and international dialling; mobile telephones; telegraph, telex and telefax; and data transmission; as well as international radio and television transmission.

346. The Town Tower building in Kuwait City provided all telecommunication services. A new telecommunications centre was being built adjacent to it. The Tower buildings at South Sabahiya and Shuwaikh provided national services. Twenty-eight local stations covered the national telephone service.

347. A satellite Earth station, located in the north (see map 5) contained in a single complex two satellite antennas for Atlantic Ocean transmission, one for the Indian Ocean, one for Inmarsat and one for Arabsat transmission. The complex provided international telephone, telegraph, data transmission and television services.

348. A transmitting and receiving station, also located in the north, was used mainly for telegraph, news agencies and radio broadcast. It contained a complete multiplex and antenna towers for radio frequency transmission. Other important installations were a microwave transmission system, two international exchanges and a mobile Earth station.

349. The postal services consisted of eight full-service postal stations, 60 local stations with limited services, a full-service vehicle garage with 60 cars and 5 large transport trucks and a modern automatic sorting system.

2. Assessment of damage

350. The inspection of the telecommunications facilities by the mission indicated widespread disruption in the system and considerable harm to its physical infrastructure. The Town Tower building in Kuwait City has been ravaged. A 30,000-line telephone exchange, large quantities of equipment and spare parts have been stolen or vandalized. Cables, accessories, office equipment and supplies have been removed or damaged. Other installations and facilities have experienced damage ranging from 10 per cent to as much as 50 per cent.

351. The old building has suffered extensive damage to furnishing and other interior structures, and parts of walls and windows have been blown out. The damage is assessed to be in the order of a fifth of its total value. The new building has been hit by a bomb and the ninth, tenth and eleventh storeys have been severely damaged. They require extensive repair.

352. The tower building at South Sabahiya, with 20,000 local telephone lines and postal services, has been totally destroyed by explosives. The tower building at Shuwaikh is not structurally damaged, but the fourth, fifth and sixth floors have been completely looted. The mobile exchange, with a capacity of 25,000 subscribers, has been stolen. Spare parts, office equipment and supplies, testing equipment, computer terminals, tower antennas, public service accommodations, furniture and air-conditioning systems have been stolen or rendered unusable. All this amounts to a considerable loss, which is estimated to be about one third of its replacement value.

353. At the Umm Al-Haiman exchange, a fire caused heavy damage to the interior of the building and the equipment was torn out. The buildings and installations at Faylakah, Abdali and Wafrah have reportedly suffered total damage.

354. All other exchanges have sustained partial damage to power supply, test, maintenance and spare part equipment and supplies. Furniture, documentation, office equipment and supplies have either been wrecked or pillaged. The losses run from heavy to total.

355. The damage at the satellite Earth station and the transmitting and receiving station, both located in the north, is total. Equipment at the Arabsat and Inmarsat satellite stations was taken, and the station structures were subsequently destroyed by explosions. Although some buildings still remain at the satellite Earth station, the damage is so extensive that the station can be considered totally lost. Approximately four fifths of the microwave system used for television transmission has been removed or is damaged beyond normal use. A mobile satellite Earth station has also been stolen.

356. The Ministry General Store, containing spares for almost everything needed to operate the telecommunication industry, has been looted. The loss is of the order of 50 per cent. The main workshop is bereft of virtually all spare parts and tools. The engineering building has lost most of its documentation, equipment and office supplies. From the administration building, most office equipment, computers, furniture, copy machines, etc., have been stolen. From the technical and finance buildings, and from the training building, virtually everything has been taken.

357. The extent of the damage inflicted upon the underground public network, serving about 500,000 subscribers, will be clear only when the whole telephone network can be tested.

358. The telecommunication services in Kuwait had virtually come to a standstill by the end of February 1991. Provisional arrangements are being made to provide only the most basic needs. The complete reconstruction of the services will take considerable time.

359. The postal service has suffered an almost total loss of equipment and supplies. The full-service garage, serving about 60 postal vehicles and 5 large transport trucks, has been rendered completely destitute. The $3 million automatic sorting system has been removed, as have the revenue and postal stamps along with their safe containers. There is no postal service in Kuwait at the present time.

360. A comprehensive assessment of the entire sector can be only tentative at this stage. The estimates of damage inflicted upon the telecommunication and postal services are based primarily on preliminary investigations and the visual inspection of facilities. The international telecommunication services however have suffered almost total damage with the destruction of the Earth satellite facilities and the plundering of the Town Tower installations.

361. The losses in the national telecommunication sector exceed 50 per cent of the value of original assets. The corresponding losses in postal services are still higher. In addition to the reconstruction and equipment replacement costs, a considerable loss of revenues will occur in all the services. Total losses in this sector could amount to $1 billion or more.

D. Illustrations

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1. Partial destruction of the Bubiyan bridge linking the island with the mainland 89

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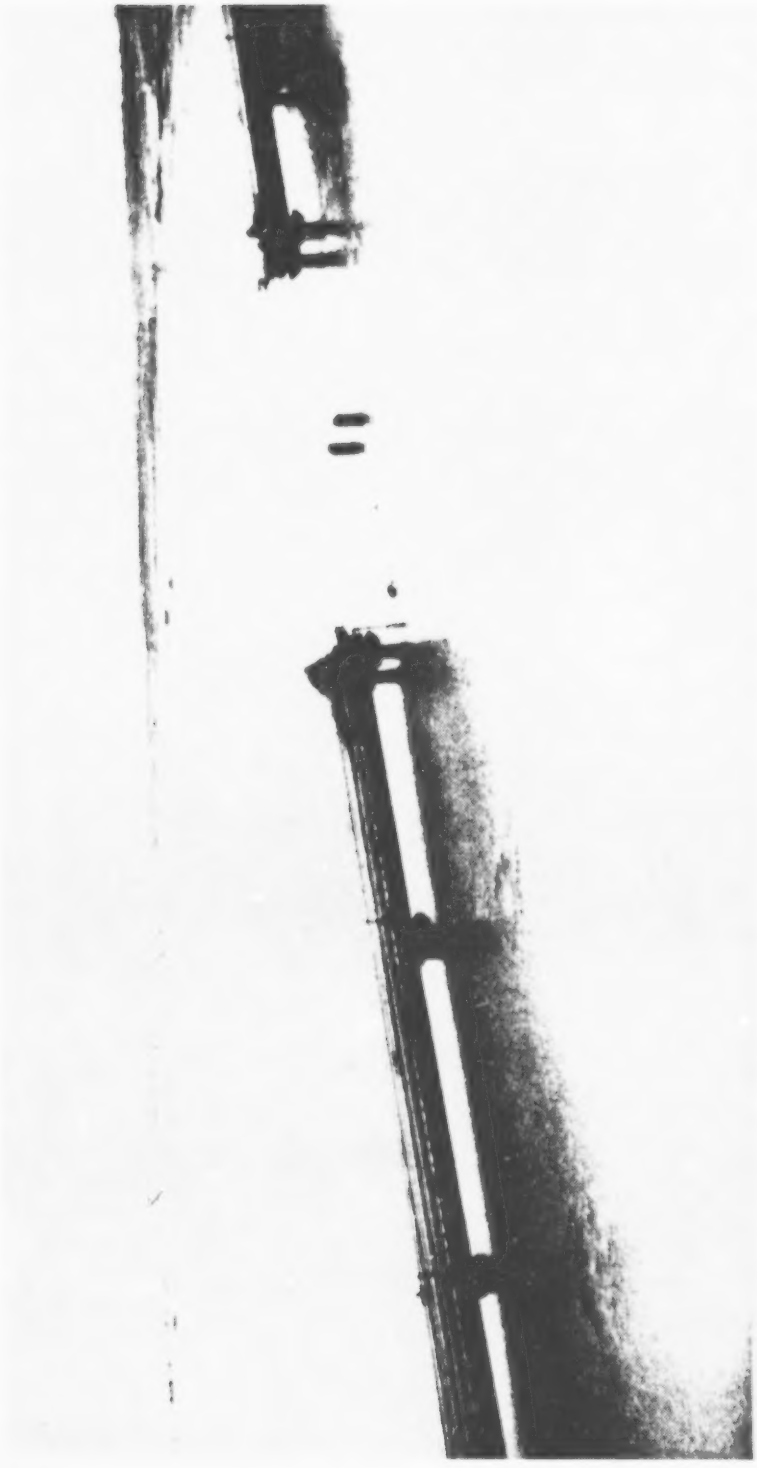

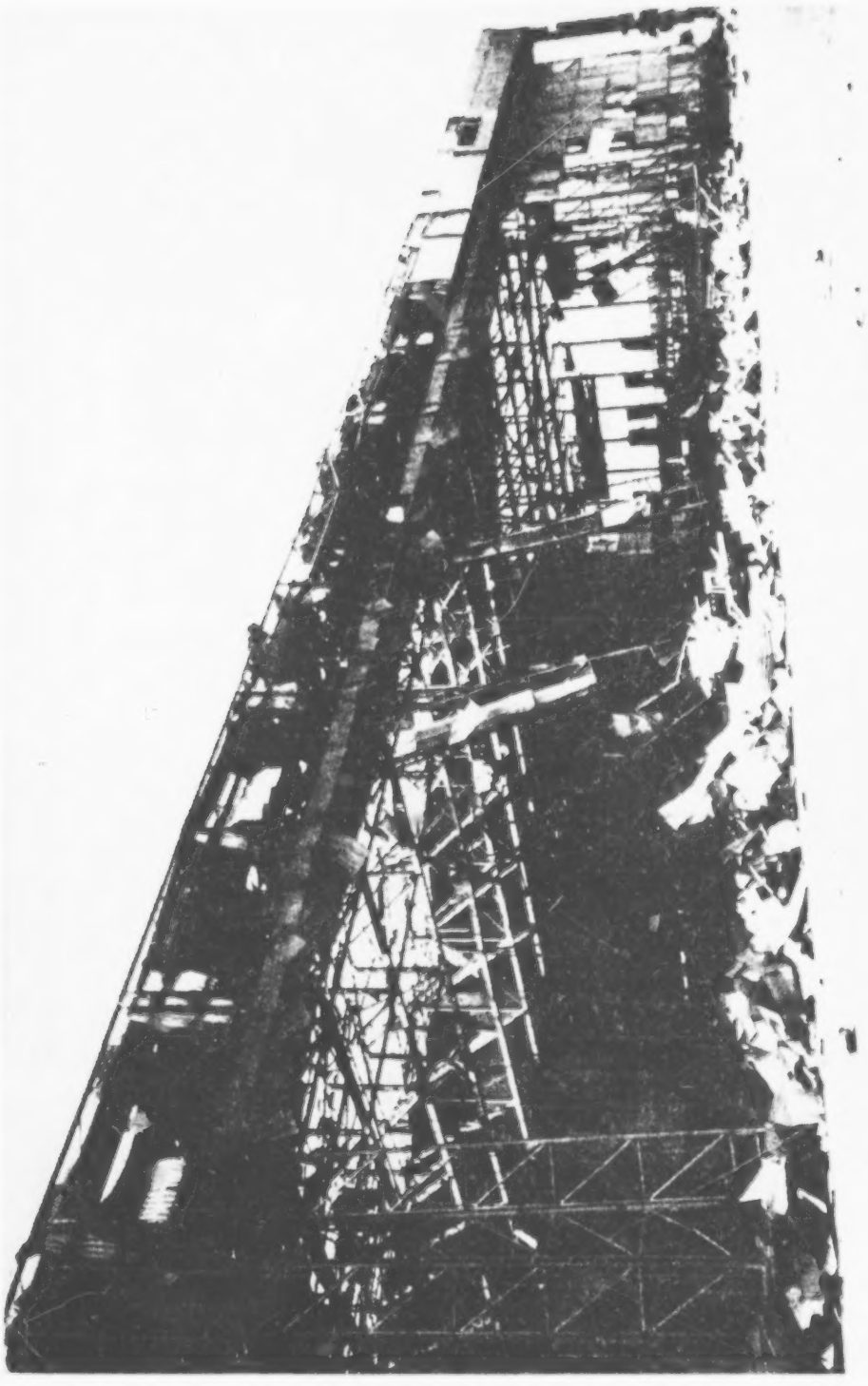

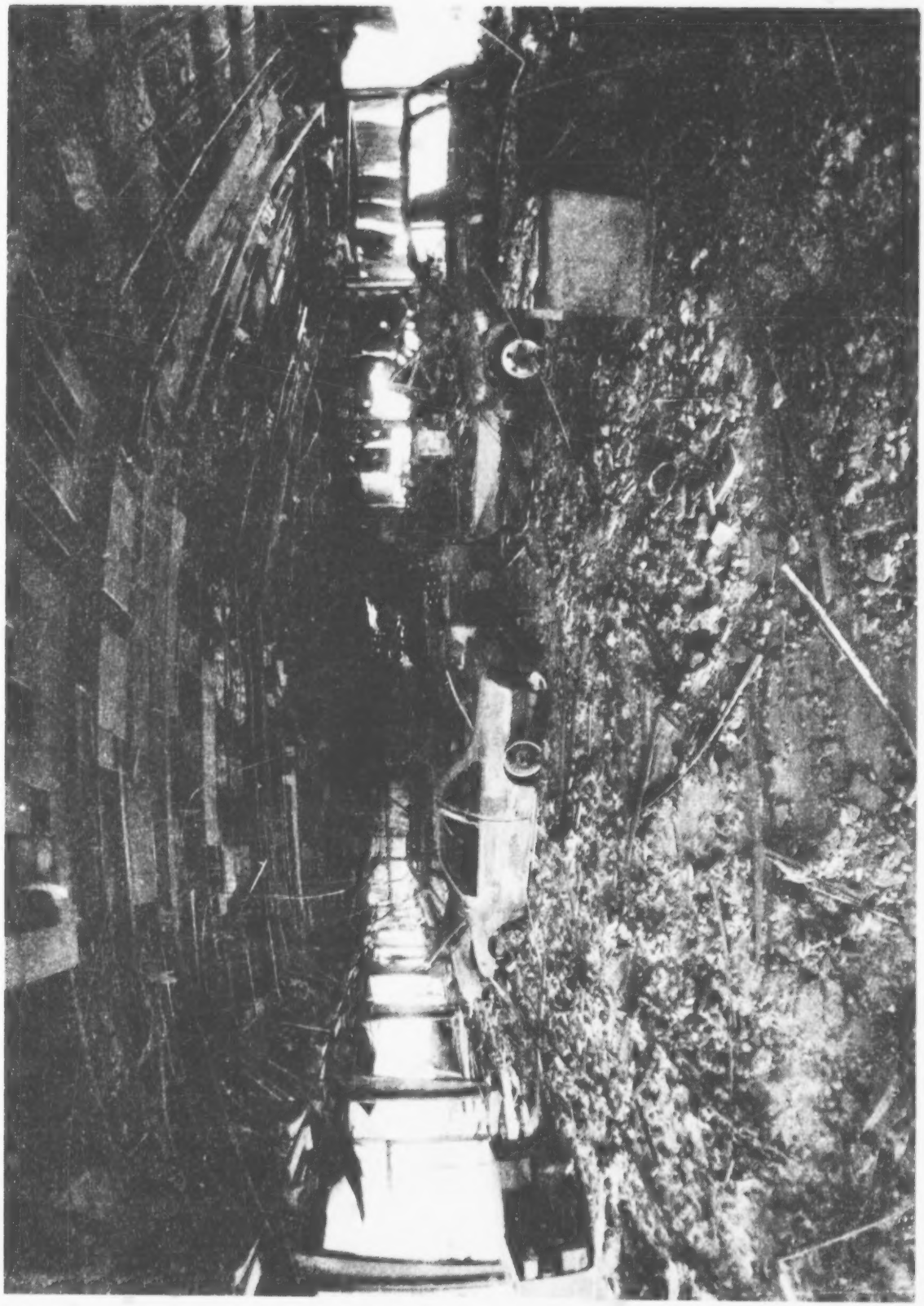

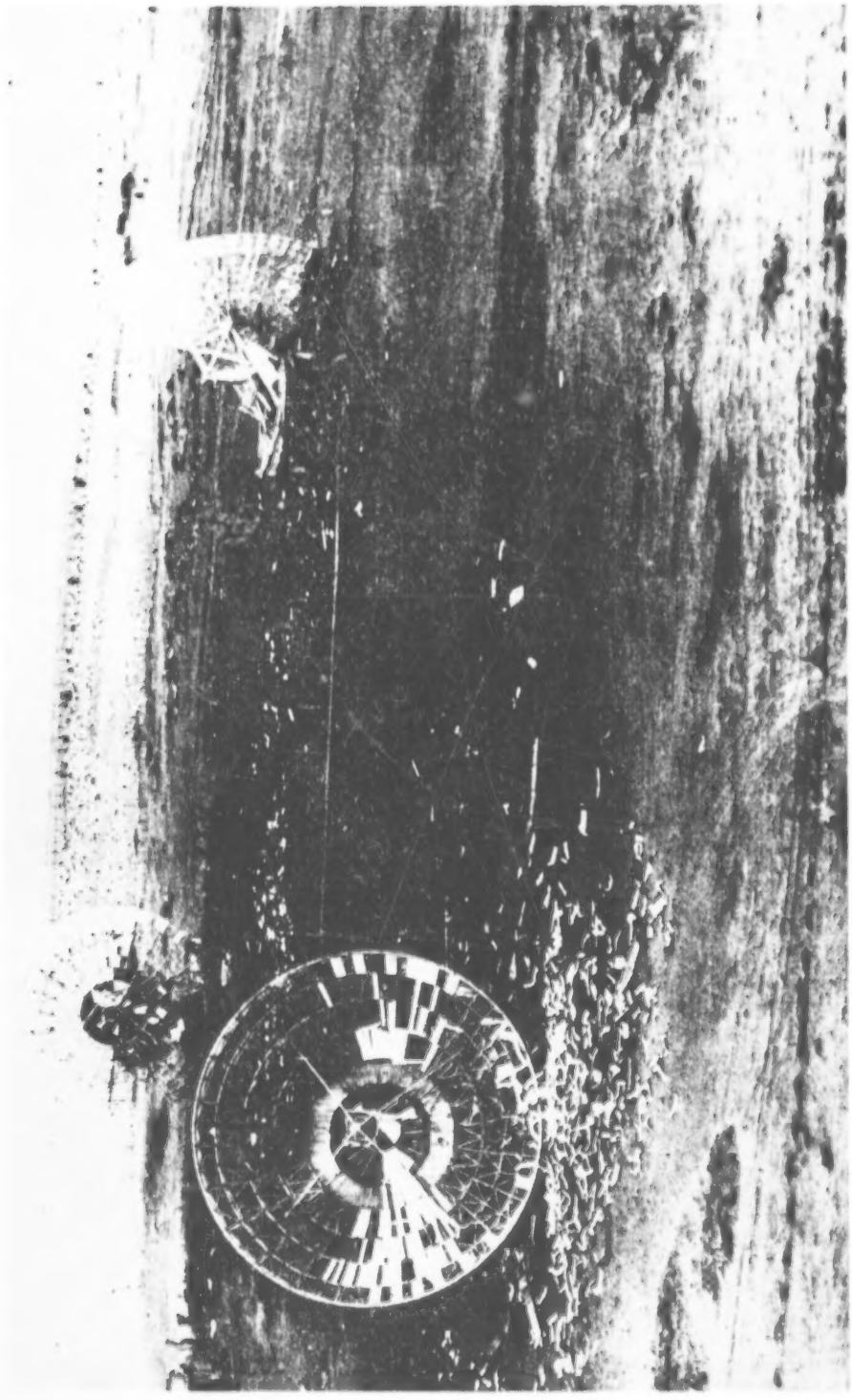

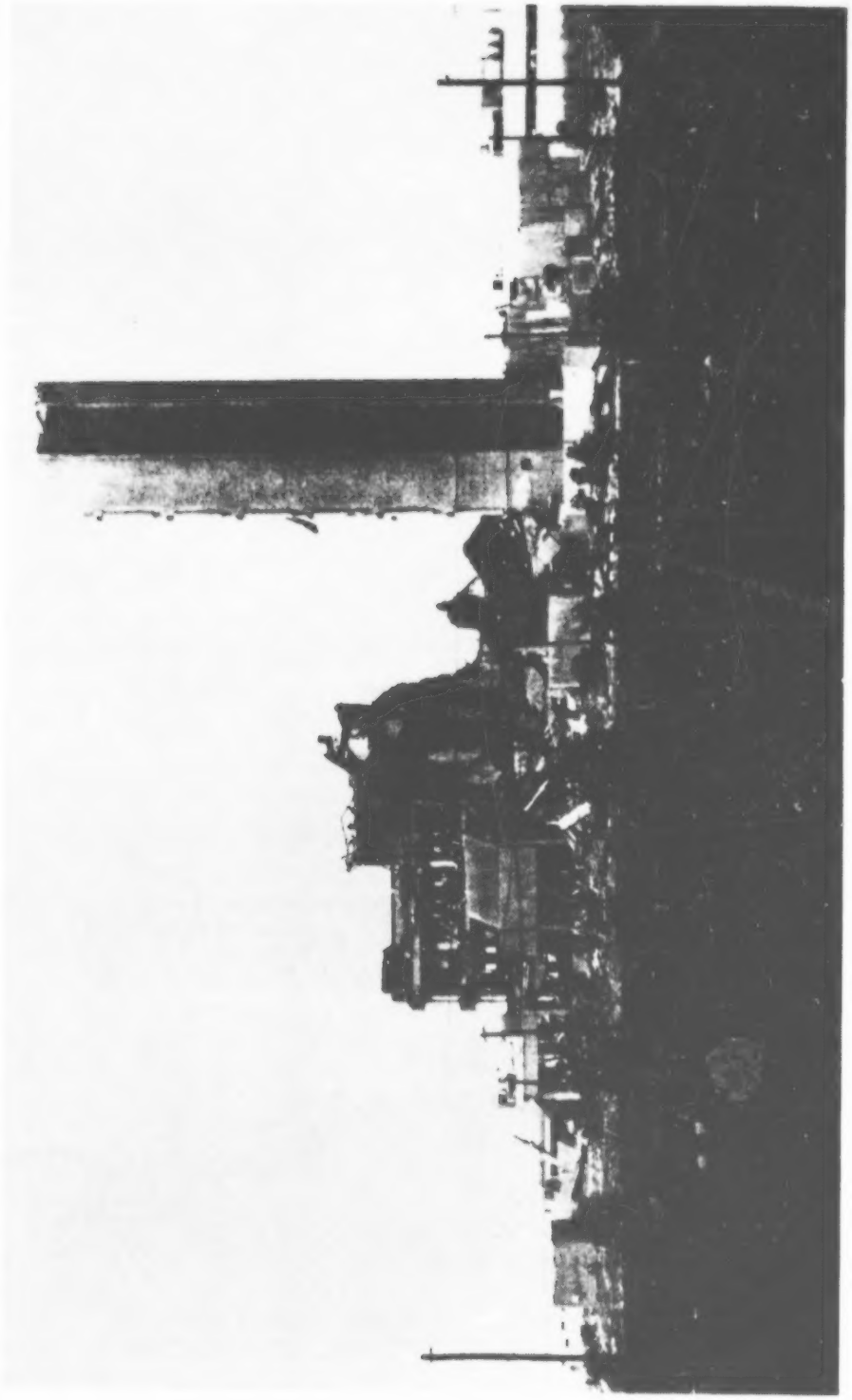

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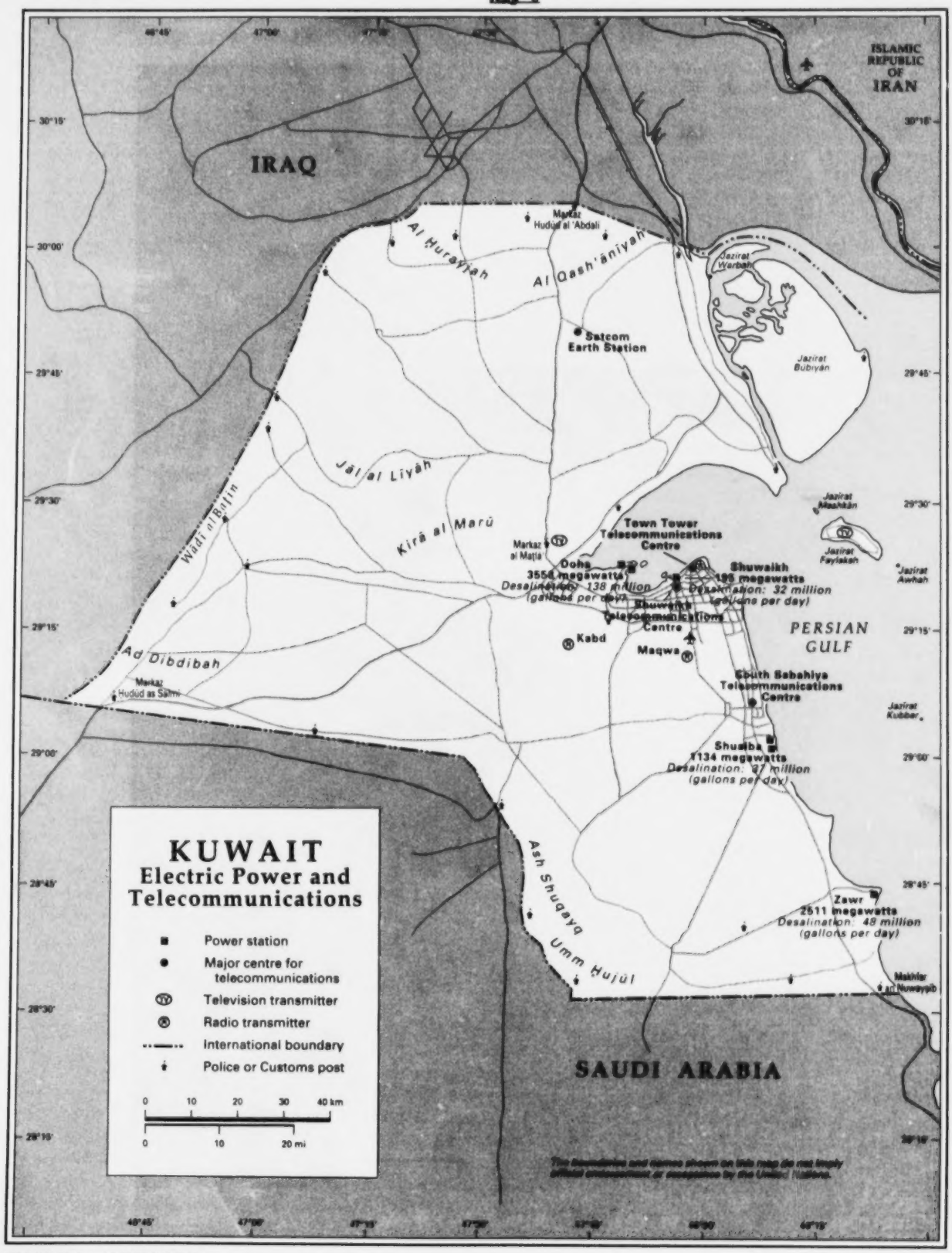
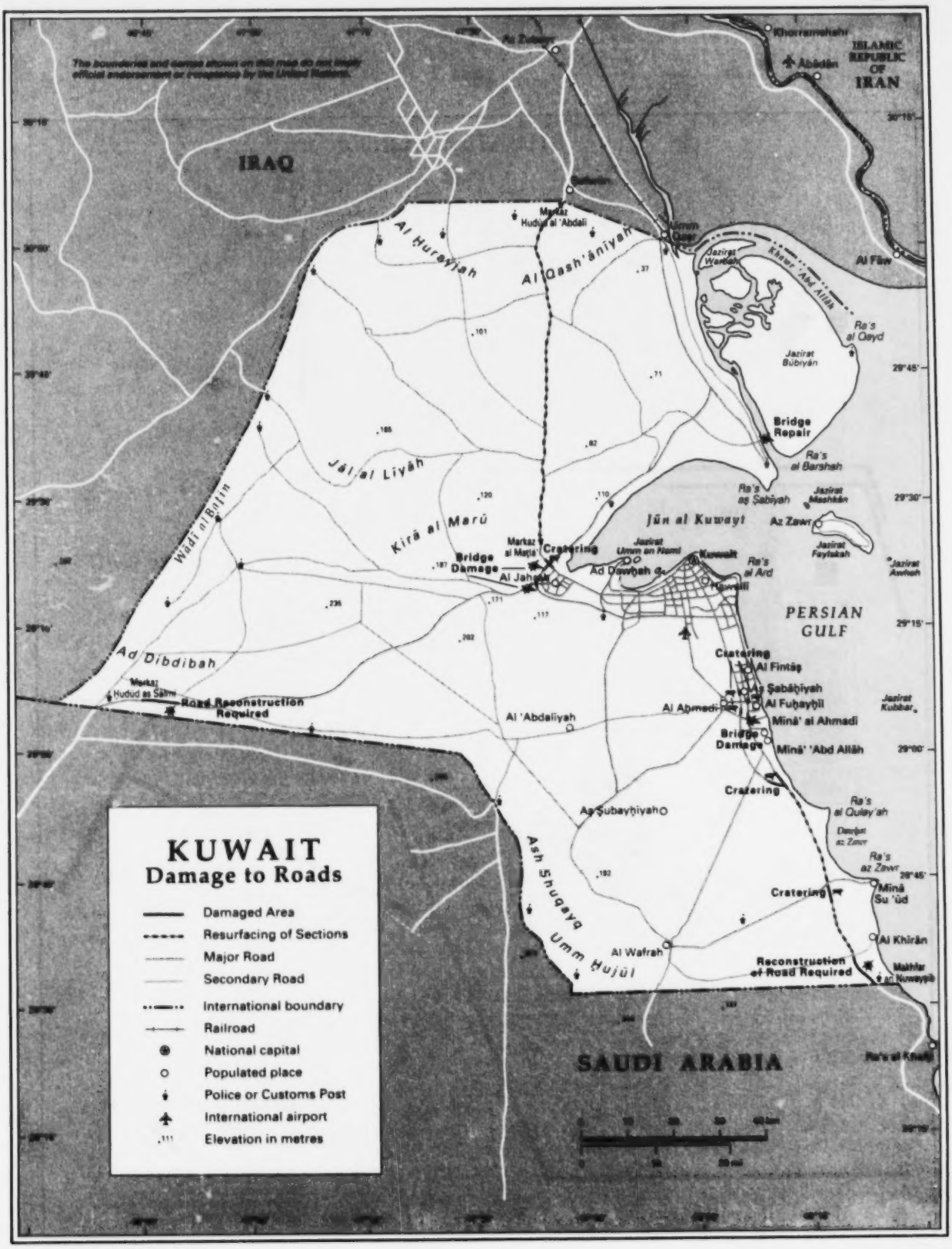


MAP NO. 3631.4 UNITED NATIONS
APRIL 1991

Map 6



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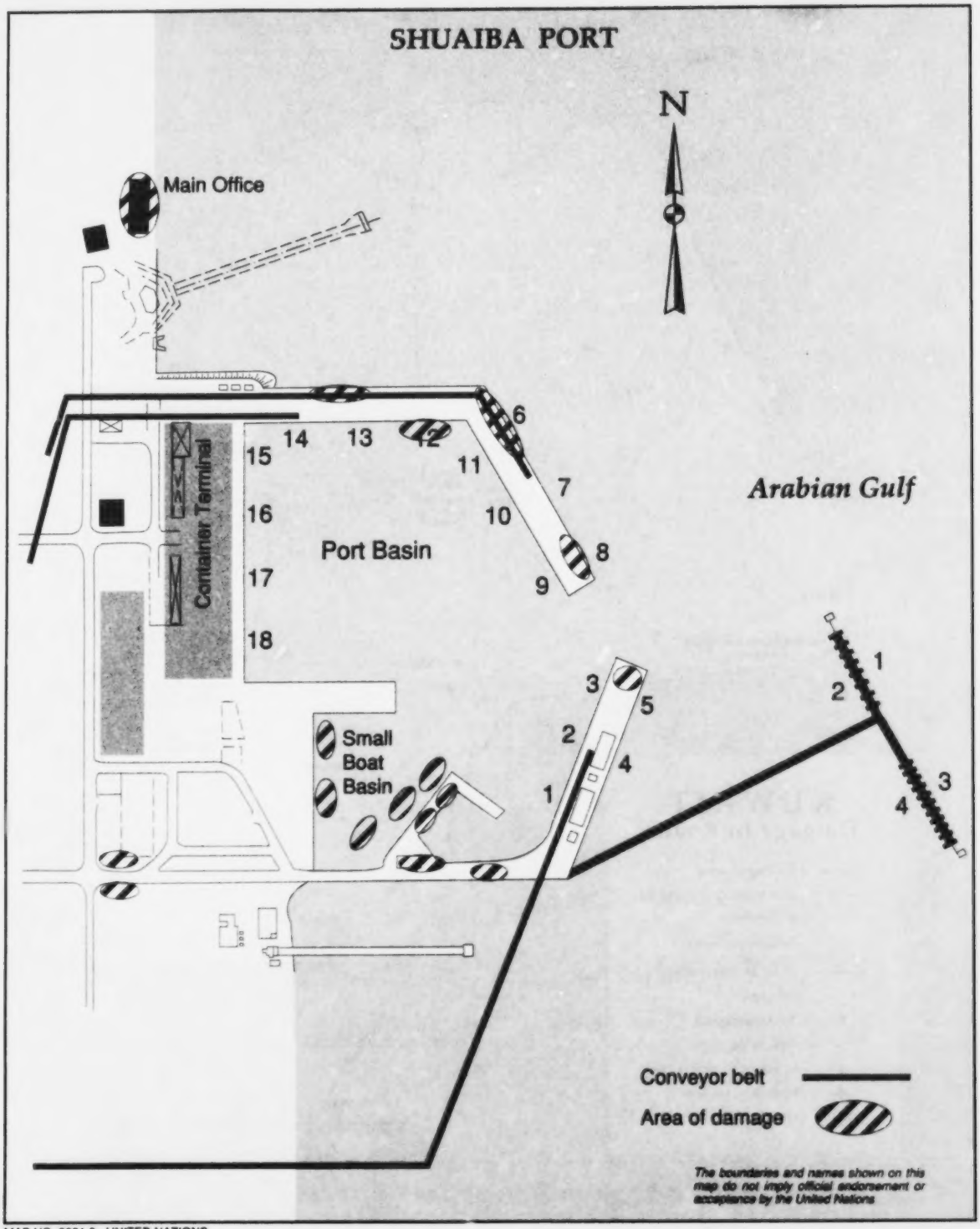
Map 7



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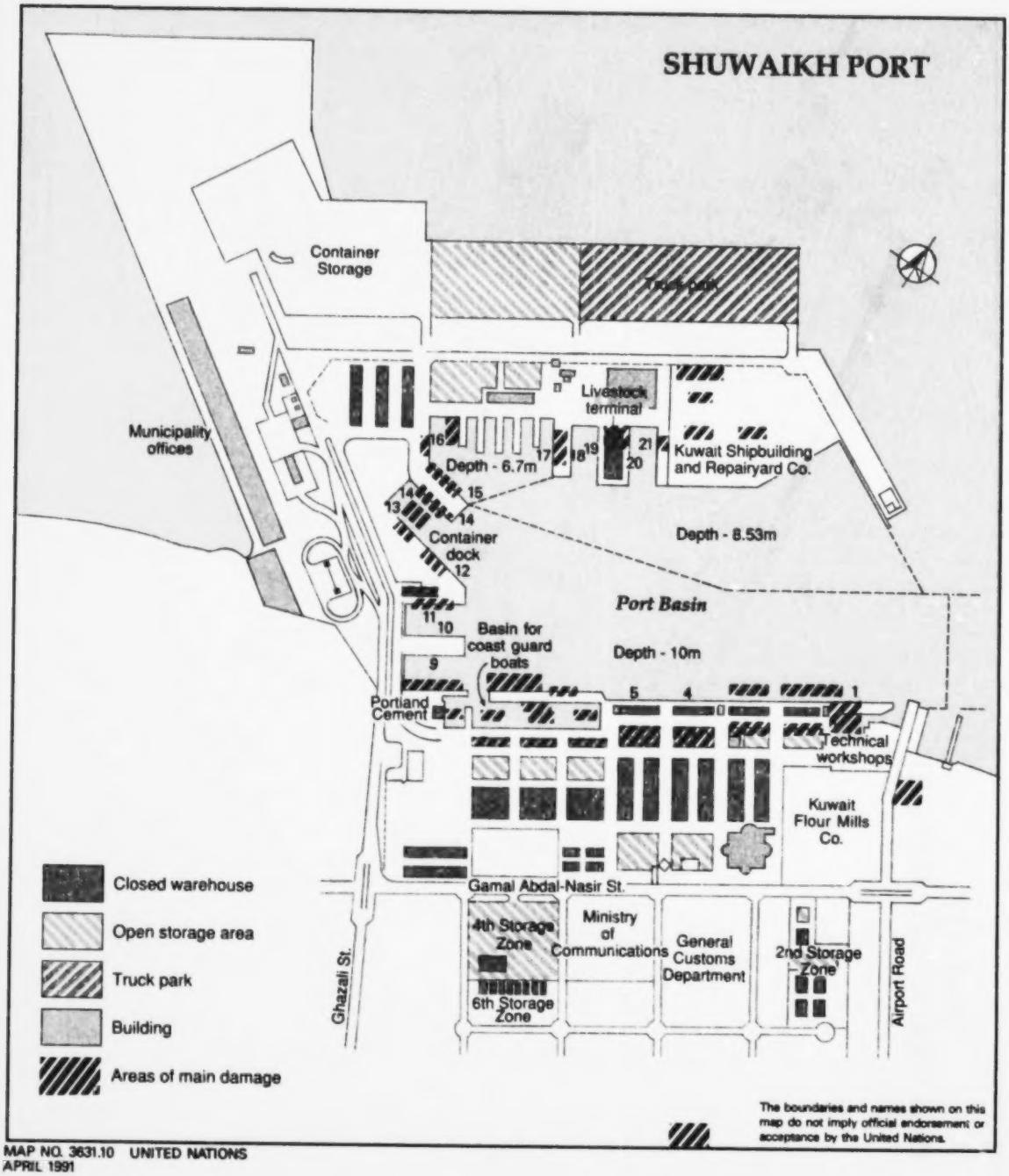
Map 8



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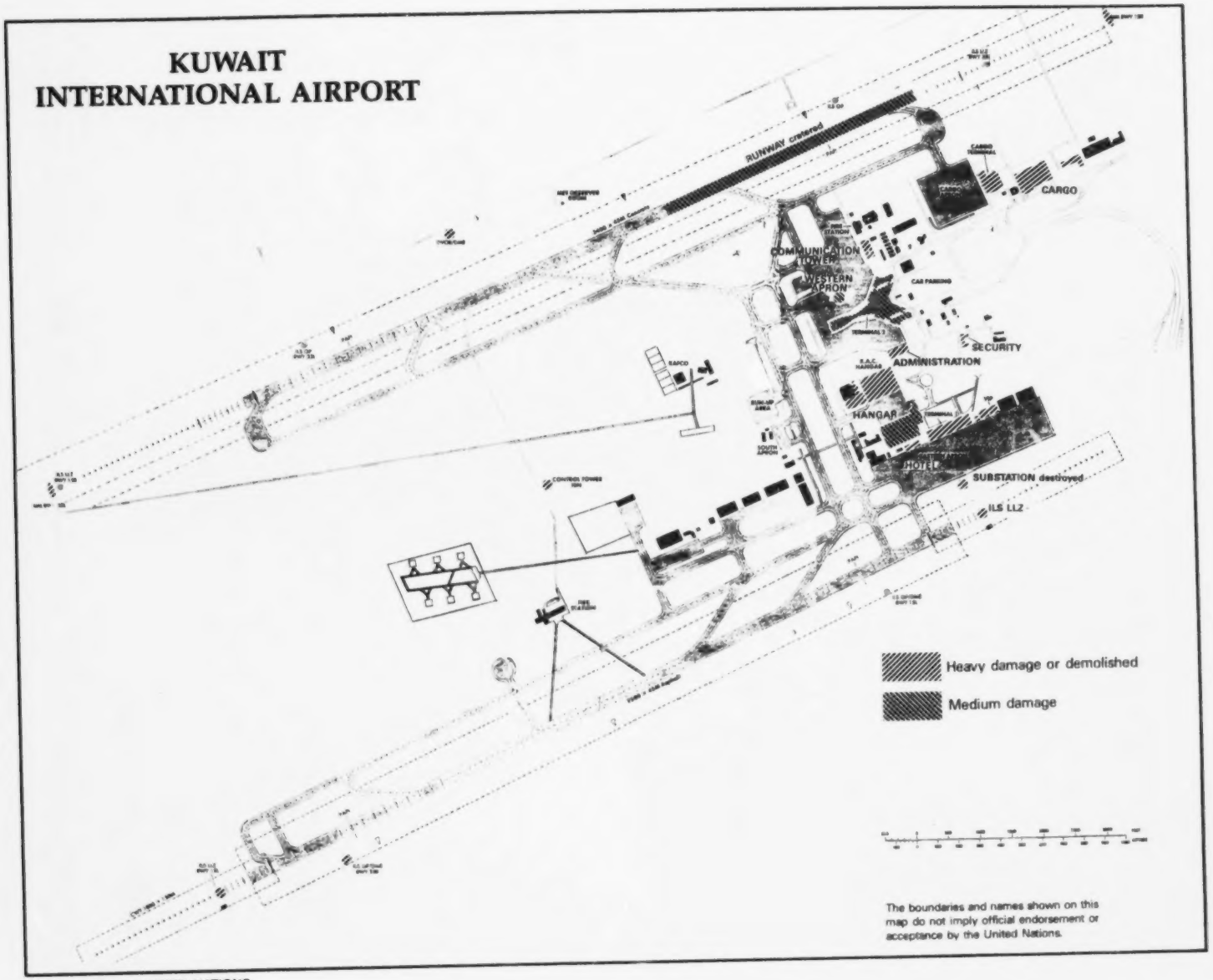
KUWAIT INTERNATIONAL AIRPORT



MAP NO. 3631.8 UNITED NATIONS
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Map 9

VII. HOUSING, URBAN INFRASTRUCTURE AND MUNICIPAL SERVICES

A. Residential housing, government buildings, hotel and tourism industry

1. Residential housing

(a) Situation before 2 August 1990

362. Before the invasion there were over 260,000 dwelling units in Kuwait, including single homes and apartment buildings. More than 70 per cent of these were in Kuwait City and its suburb Hawalli, 18 per cent in the Governorate of Al Ahmadi and 11 per cent in the Governorate of Jahrah (see map 10).

363. Forty per cent of the housing stock comprised individual villas. They were of concrete construction and of a good to high standard, ranging in value from 30,000 to 60,000 Kuwaiti dinars. Apartment buildings were of a moderate standard; a few located along the waterfront were of particularly high quality. There were also some units of modest standard.

(b) Assessment of damage

364. Inspection visits by the mission to all residential areas revealed widespread ransacking and vandalism of homes, shops and business enterprises. In the residential areas the damage was centred on those homes whose owners or tenants had fled the country at the time of the invasion. It was estimated that in the case of Kuwait City and its suburb of Hawalli, where 70 per cent of the residential units are located, approximately 120,000 housing units were affected. In Al Ahmadi about 35,000 residential units had been ransacked, as had somewhere in the region of 18,000 residential units in the Governorate of Jahrah. Random but detailed sampling covered more than 100 apartment buildings and dwellings in Kuwait City and more than 50 each in Hawalli, Al Ahmadi and Jahrah.

365. While most inspection was done by road survey, a large number of housing units were also randomly sampled by the mission in such urban areas as Fahaheel, Subahiya, Rikka, Abu Halifa, Fintas and Mahboula. The mission also consulted with neighbourhood cooperatives to ascertain damage to individual dwellings in their particular areas.

366. In the Rumaithiya district of the Hawalli Governorate, the mission estimated that three quarters of the houses had been looted and vandalized and 65 dwelling units totally destroyed. In the neighbouring district of Sabbah Al-Nasser, about two thirds of the houses had also been pillaged.

367. Particularly affected were residences of members of the ruling family, ministers, senior government officials and military personnel. Some were, in fact, not only looted and vandalized but gutted. Houses and buildings located

along the coastline, and which happened to be the more expensive and luxurious, appeared to have suffered more than others. It was along the coastline that the occupation forces had positioned a great number of their troops as part of the defence. Consequently they occupied most of the houses and fortified a large number of them. Those houses were not only looted and vandalized but some of their structures damaged. The exteriors displayed particular evidence of such damage since they were used to position troops and weaponry. Pillboxes, bunkers and dug-outs have defaced the urban landscape along the seafront and considerable expense will be required for their removal.

2. Government buildings

(a) Situation before 2 August 1990

368. The headquarters of all government ministries were located in Kuwait City. Government departments and autonomous agencies were located throughout the country, although most had their principal offices in the capital.

369. All the ministries and the National Assembly had been supplied with most modern office equipment and furnishings and the majority were housed in modern buildings. By way of illustration, one major complex, built in 1985 at a cost of $175 million, comprised six ministries, a large commercial bank and other facilities. The Justice complex was built in the same year at a cost of $70 million. The standard of maintenance of those buildings and equipment within them were high.

(b) Assessment of damage

370. The mission surveyed all ministry buildings. Surveys of their subsidiary departments and agencies, located outside these buildings, are detailed separately in the relevant sectors of the present report.

371. The building housing the Ministry of Foreign Affairs was ransacked and vandalized. All movable equipment had been removed and some installations damaged. Documents, files, archives and books had been pulled from their cabinets and shelves and scattered in the corridors or in open spaces within the compound. The main reception and conference halls, offices on all the Ministry's three floors and their support facilities had been plundered. The greater part of the furnishings had been damaged beyond repair. Floors appear to have been intentionally flooded, leaving a pervasive dampness throughout the building.

372. The National Assembly was gutted, while walls and ceilings in many offices in the Ministry of Health suffered considerable damage and virtually all its premises had been ransacked.

373. The government complex comprising six ministries was used for military offices throughout the occupation period. Furniture was removed from all

offices of the Ministry of Social Affairs and Labour and from many offices in the Ministry of Social, Awqaf and Islamic Affairs and the Ministry of Justice. All computers and sophisticated audiovisual presentation equipment were removed from the Training Centre of the Ministry of Finance, as were furniture, chairs and carpets.

374. Shelling damaged the main entrance and the ground floor of the Ministry of Planning. Its library was severely vandalized. All computers in the Ministry of Education were removed and there was also evident looting of other equipment and furnishings.

375. The premises of the Finance Department of the Ministry of Public Works were gutted by fire. In the Ministry of Interior and the Ministry of Higher Education, the looting of office materials and equipment was massive.

376. Overall structural damage was minor and will involve mainly renovation to the interior and exterior walls and repairs to installations. The replacement of equipment, re-establishment of communications and refurbishing of interiors will cost several million dollars and take considerable time. Ministries are currently operating from make-shift locations.

3. Hotel and tourism industry

(a) Situation before 2 August 1990

377. Prior to the occupation, Kuwait boasted of a flourishing hotel and tourism industry. This comprised 18 hotels, of which 6 were deluxe and 3 first-class with the number of rooms ranging from 200 to 500. There were two large resort complexes at Al Khiran and on Faylakah Island. These could accommodate 4,000 guests in 670 chalets. The deluxe hotels provided employment to 2,200 managerial and service staff.

(b) Assessment of damage

378. The hotel and tourism industry has been brought to a standstill. An organized and systematic effort appears to have been made in the last few days of the occupation to damage or destroy all nine main hotels. Three of the deluxe and first-class hotels are complete wrecks. Four have been heavily damaged to the point where it will require at least nine months, if not more, to put them back into commission. Damage to two others has been significant.

379. The Al Khiran resort complex, which had 198 chalets, has been completely vandalized and looted. More than half of the yachts and motor boats in its marina have been sunk. The Failaka complex could not be surveyed because of the apprehension that its surroundings were mined; damage here too is reported to be heavy.

380. The on-site inspection of the hotels by the mission revealed not only the enormous degree of pillage and plunder but significant structural damage of

varying severity. The use of explosive charges and incendiary devices in virtually all of these hotels was manifestly evident. Reception and catering areas, bedrooms and suites had been burnt. Appliances, furnishings and equipment had been ripped out and removed. In-house shops had been ransacked and safety deposit boxes blown up. It is estimated by the hotels concerned that the cost of rehabilitation and reconstruction work on the deluxe hotels would cost about $800 million, based on 800 rooms at $100,000 per room.

381. A particular loss to the Kuwaiti people was the damage caused to social and recreational amenities, including sports stadiums and the popular "Entertainment City", just north of the capital. Many of these facilities were destroyed and their movable fixtures pillaged and vandalized. The deprivation that will be most keenly felt will doubtless be that of the $225 million Kuwait City waterfront project, which was not only one of the country's largest urban and touristic projects but a retreat for its population. The waterfront has been rendered unusable because of fortifications constructed by the occupation forces, and because of the widespread destruction of social facilities and commercial establishments on the shore. In recent weeks, there have been reports of children straying into the area and being maimed by mines and booby traps. It is feared that, with the onset of the hot weather, such incidents will increase dramatically.

382. Damage was also considerable at all the 17 sporting clubs. They were used for military purposes during the occupation period. Two clubs were completely destroyed by bombing and, while the rest remained structurally intact, practically all furniture, fixtures, sporting facilities, medical and other equipment were looted. The reported losses in all these clubs as a result of structural damage and looting is estimated by the Ministry of Social Affairs and Labour to amount to $380 million.

383. The mission surveyed all eight cinema houses in Kuwait City and other main towns. All had sustained heavy damage in terms of plundering of equipment, looting of attached shops and pervasive destruction of seating and furnishings.

384. The Kuwait International Fair, a modern complex that could accommodate a fairly large industrial exhibition, comprised eight pavilions in addition to recreational and parking facilities. The pavilions all had steel frame structures and extensive concrete floors. Three pavilions with a surface of more than 34,000 square metres were totally destroyed and will have to be rebuilt; one was heavily damaged and requires major repair; two suffered moderate damage and only one was virtually unaffected. On the whole, the loss to the complex is above 50 per cent of the replacement cost of all existing installations at the time of the invasion.

B. Municipal services

1. Water supply

(a) Situation before 2 August 1990

385. Kuwait is dependent for its water supply upon the distillation of sea water and wells in brackish water fields. Water is rendered potable at four desalination plants, operating in conjunction with the power stations at Az Zawr, Shuaiba, Shuwaikh and Doha, with a total maximum capacity of 250 million gallons a day, which comfortably exceeded the average demand of 140 million gallons a day. There are four brackish water fields with gathering centres at Wafrah, Umm Ghudayr, As Suboyhiya and Sulaibiya, with a total capacity of 100 million gallons a day.

386. The distilled water from the desalination plants is fed into a water-complex installation. At the complex the distilled water is blended, treated with chemicals and stored in reservoirs. This water is then pumped to subsidiary district pumping stations, and thence to the local consumer network or to tanker-loading stations. The total piped network extends for nearly 10,000 km.

387. The brackish water is pumped from wells to gathering stations. Here it is pumped either to the main water-complex installations for blending or directly to district pumping stations and thence to the consumer brackish water network (primarily for irrigation, livestock and industry).

388. The country has 18 district pumping stations, 25 storage reservoirs and 13 sets of high-level tank "towers", including Kuwait Towers, which alone has a capacity of 2 million gallons. The total storage capacity of the system is approximately 300 million gallons. A map of the main distribution system is shown in map 11.

(b) Assessment of damage

389. The mission visited all four desalination plants, two pumping stations, various storage towers and reservoirs and portions of the major pipelines. The damage to desalination plants has been documented together with the power station assessment as they are closely related to each other.

390. The main district pumping station at Mina Abd Allah, only recently constructed at a reported cost of over $40 million, was severely damaged by bombing. The main control building, generator building and recirculation plant were completely destroyed. The major equipment suffered moderate damage, although the pumps are at present immersed and may have resultant damage. It is anticipated that the Mina Abd Allah station will require at least 12 months to repair. As this station is the only one capable of pumping water from the Az Zawr desalination plant in the south to Kuwait City, its incapacity will be a loss during the early stages of restoration. It is however possible to feed Shuaiba from this installation by gravity feed.

391. There has otherwise been little damage to the main water complex installations, with the exception of that at Az Zawr, where most of the damage was minor. It had been largely repaired by the time of the mission's visit.

392. The brackish water pumping station at Sulaibiya has been completely destroyed. Military restrictions precluded visits to the other stations. However as they are all in areas where military operations took place, considerable damage is likely.

393. Some reservoirs and storage towers have suffered minor superficial damage. The rest appear untouched, although the storage towers have been empty for some time and there may be some unknown equipment damage.

394. The major pipe network has sustained some minor damage. The line between Az Zawr and Mina Abd Allah was cut at two places and many air-cocks and valves have been broken on the pipe to Wafrah and to Rawdatayn in the north. This damage is not difficult to repair. More breaks may appear, however, when water is pumped through the major pipelines. The local network has not yet been tested and some pipe breakages can be expected, especially in the waterfront areas of Kuwait City and Al Fintas. A significant number of consumer outlets (residential, commercial and industrial) have also been broken as a result of looting and vandalism of fittings. A large number of water tanks at factories and residences have been removed and taken to the battle front.

395. A major ancillary problem when water is restored will be the stagnant water and sewerage infiltration in the pipes. There will be a major health hazard until all pipes are thoroughly flushed.

396. Most offices and installations of the Water Department, including the main control centre and the testing laboratories, have been comprehensively looted of equipment, manuals and data. The control system at the control centre escaped unscathed. The mission was told that nearly all vehicles belonging to the Department were taken by the invasion forces.

397. Over all, with the exception of the desalination plant at Shuwaikh and the pumping station at Mina Abd Allah, this sector has suffered only minor structural damage, which can be repaired in a reasonably short time. It is expected that 12 to 15 million gallons a day will be available immediately when limited power is restored. That is about one tenth of the total demand for Kuwait at the present time.

2. Sewerage

(a) Situation before 2 August 1990

398. The Kuwait sewerage system served over 90 per cent of the population of the urban areas of Kuwait (see map 12). It comprised three major treatment works (Jahrah, Ardiyah and Rikka), with an additional minor treatment works on Faylakah Island. The raw sewerage passed through a three-phase filtration and

settlement process and most of the treated effluent was used to irrigate dairy and vegetable farms. All treatment works were controlled and monitored with state-of-the-art equipment.

399. A major contract to complete a data-monitoring centre in Sulaibiya was concluded in the first half of 1990 at a reported cost of over $60 million. This centre contained a very sophisticated monitoring system for effluents, with laboratories and a communications network to all stations. It also housed the main workshop for the Sanitation Department as well as the main storage areas for plant and spares.

(b) Assessment of damage

400. The sewerage treatment system has been out of operation since the end of February, following the cut-off of power and water. Before that time the Ardiyah treatment works were kept in full operation and the Jahrah and Rikka plants in partial operation. The mission inspected the Jahrah and Rikka treatment plants, as well as selected pumping stations, the data-monitoring centre and the Sulaibiya irrigation farm. Iraqi forces were reported to have been stationed at the Jahrah and Rikka plants and at the data-monitoring centre throughout the occupation period.

401. Inspection revealed the complete and obviously systematic removal, and in some cases destruction, of the control equipment, plant and vehicles, testing equipment and supplies, spares, workshop machinery, electrical equipment (including four 500-kilovolt mobile generators at each site) and office furnishings at the Jahrah and Rikka treatment plants. Although not all of this equipment is essential for basic operation, it will require replacement to bring the system back to its previous level of safety and efficiency.

402. Emergency maintenance depots, including vehicles, equipment, spares and furnishings, were also looted and ravaged.

403. The data-monitoring centre has been completely and systematically robbed of all movable items, laboratory and test equipment and materials (including autoclaves, incubators and the computer-monitoring system), workshop machinery, plant and vehicles, an extensive spare parts stock and office furnishings and equipment. Total replacement would be required to make the centre operational. The pumping station and storage tanks at the centre appear undamaged.

404. The treated effluent from the Jahrah and Rikka plants is pumped to farms and used for irrigation. The irrigation system in the Sulaibiya area (using treated effluent from Jahrah) covers an area of 17.5 square kilometres. Although a full inspection of the farms was not possible because of military restrictions, it was apparent that this area had been used extensively by the Iraqi forces. A system of bunkers and trenches had been constructed by them and this may have effectively destroyed the irrigation network. The irrigation system in the Rikka area also could not be inspected because of military restrictions. Since Iraqi troops were also reported to have been

stationed there, it is probable that the irrigation network in that area is also in a similar condition.

405. The mission was also informed that most pumping stations had been looted and one third of them were now flooded. Other damage could not be determined at this time, although all will require special maintenance.

406. Little structural damage was sustained by any of the buildings inspected except for windows, doors and interior fittings. There appears to be minimal damage to the primary and secondary treatment and filtration tanks and heavy associated equipment (pumps and screws). However, as some of the equipment is flooded, the extent of damage cannot be confirmed until power and water are restored and the equipment checked. Such equipment will require expert maintenance before being put back into operation. Some damage has been caused to the tertiary treatment installation at both Ardiyah and Rikka.

407. No check was possible of the local collection system and the pipe network, although the mission was informed that, except for two major breaks, only minor damage is expected, other than manhole damage by heavy military vehicles and blockages in manholes and pipes caused by large objects and solidification. The gravity lines and ocean outfall are still in operation, apparently undamaged.

408. Most of the historical and research data have been looted or destroyed at all centres. The remaining data are scattered and damaged and will require careful collection and collation.

409. Over all, the sewerage treatment system has suffered massive losses of equipment. The basic collection and treatment infrastructure is in place with only slight damage and should be repaired quickly.

410. A detailed list of equipment removed or destroyed from all locations during the invasion period was submitted by the Kuwait technical authorities. It has been checked for the locations inspected and appears realistic.

411. The Sanitation Department has estimated the cost of damage and loss of equipment alone at $130 million. Given the state-of-the-art control and testing system and the newness of parts of the system, this figure appears to be, if anything, conservative.

3. Solid waste (garbage) disposal

(a) Situation as on 2 August 1990

412. Solid waste disposal in Kuwait City falls within the responsibility of the Municipality. Except for medical and other sensitive waste, which is incinerated, all solid waste is trucked to land-fill sites. The system disposed of an average of 3,500 tons per day.

413. All garbage collection and sanitation services in Kuwait are carried out under contract although the Municipality holds 140 automated compacting garbage trucks and tipper trucks as emergency back-up. Each land-fill site is well supplied with tractors and a compactor. The total plant holding of the contractors included 300 compactor collection trucks, 200 large tippers and other trucks, 350 other vehicles and 80 items of land-fill equipment, including compactors and incinerators.

414. The cleaning section of the Municipality was housed in the main municipal buildings and in addition the section had 62 branch cleaning centres in Kuwait. Each centre was typically a four-room structure with a small pool of cleaning vehicles.

(b) Assessment of damage

415. Visits were made to the main municipal offices, one land-fill site and three randomly selected cleaning centres.

416. The municipal offices were extensively plundered of all equipment and furnishings. Over 90 per cent of all the Municipality and contractors' collection trucks, tippers and land-fill equipment is reported to be missing or inoperable. This has brought the regular garbage disposal system to a complete standstill. Of the 62 branch cleaning centres, all have reported substantial loss of furnishings and equipment. The three visited by the mission were 70 to 80 per cent looted, although the structures were sound.

417. Because of the time required for the Municipality and its contractors to acquire replacement equipment lost as a result of the occupation, Kuwait has been compelled to enter into contracts with Saudi Arabian firms to carry out essential garbage collection and disposal for the next 12 months.

4. Other services

(a) Situation before 2 August 1990

418. Services provided by the Municipality also included fire fighting, food inspection, building inspection and permits and urban planning. Kuwait has 33 district fire stations and one central coordinating centre. All were linked by radio. It had a total of 350 fire-fighting vehicles, including over 60 state-of-the-art fire-fighting trucks. The total staff of the department exceeded 2,500.

419. The Municipality also had district offices for food regulation and building inspections. These typically contained four to eight offices, with three or four vehicles.

(b) Assessment of damage

420. Over 90 per cent of the fire-fighting vehicles and equipment has been taken or destroyed, including all spares and stores. All district fire stations have been reported vandalized and most of the district communication equipment has been taken or destroyed. The central control equipment, however, is intact.

421. The majority of the district food and building inspection offices have been reported looted and most of the vehicles stripped or taken.

C. Illustrations

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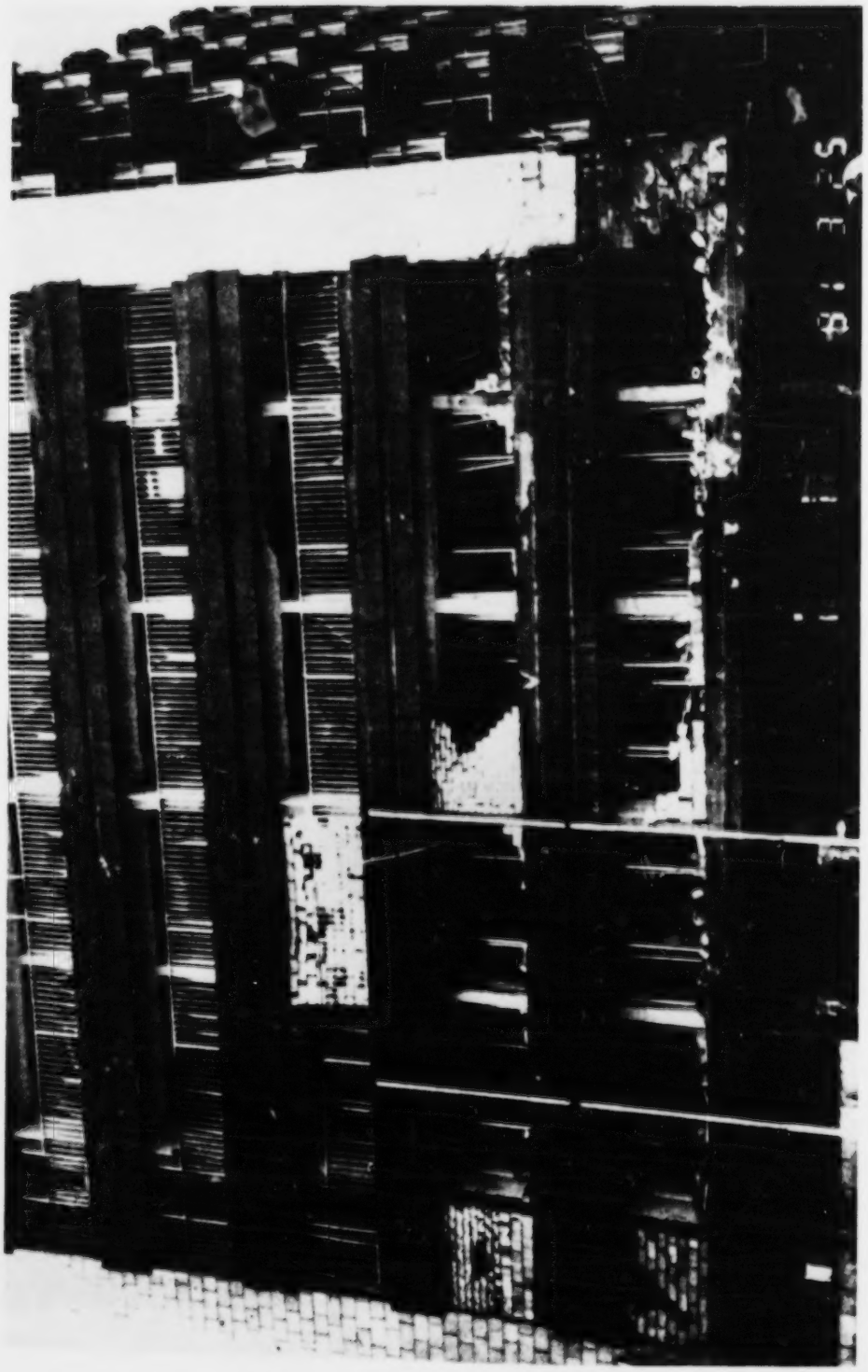

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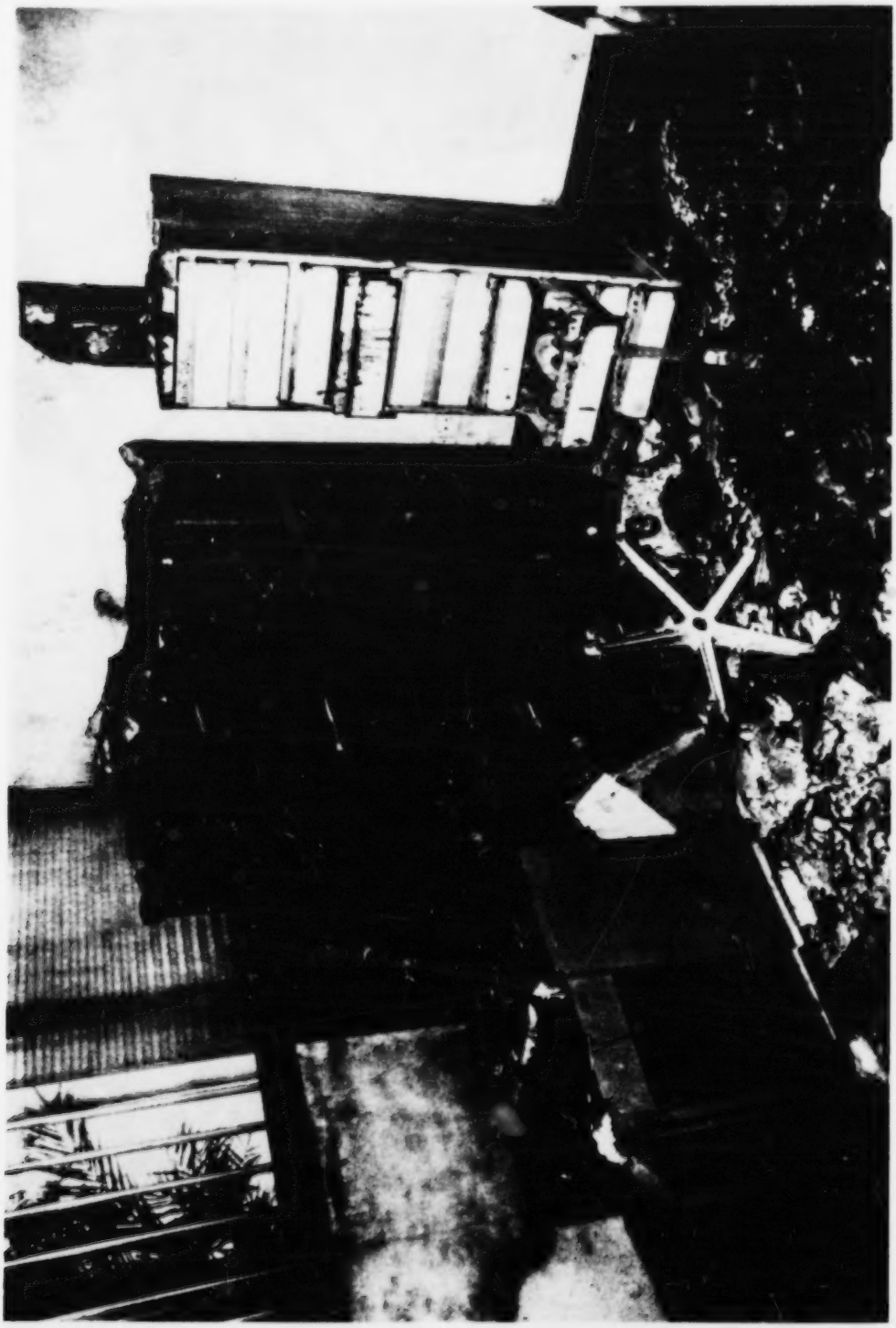
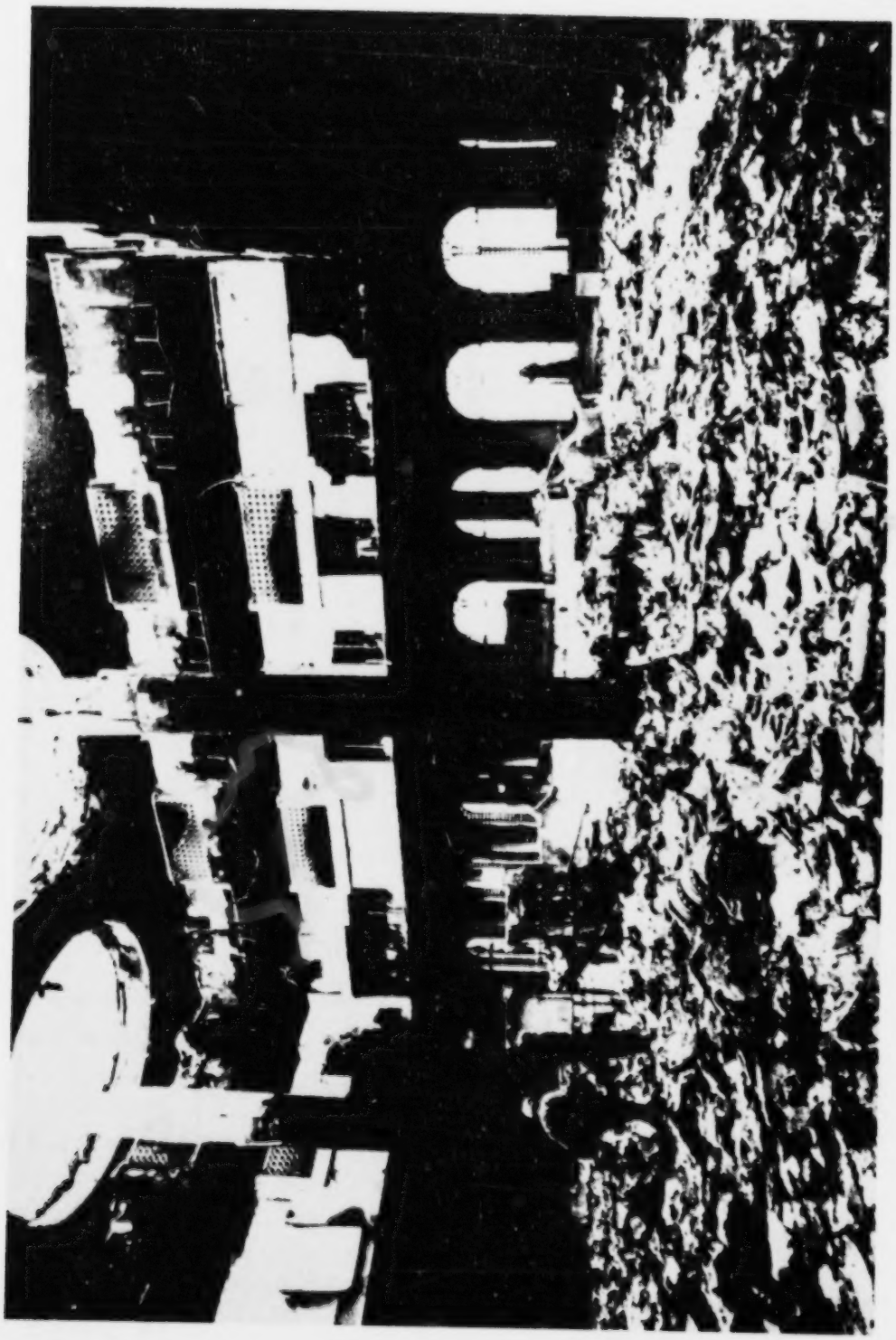
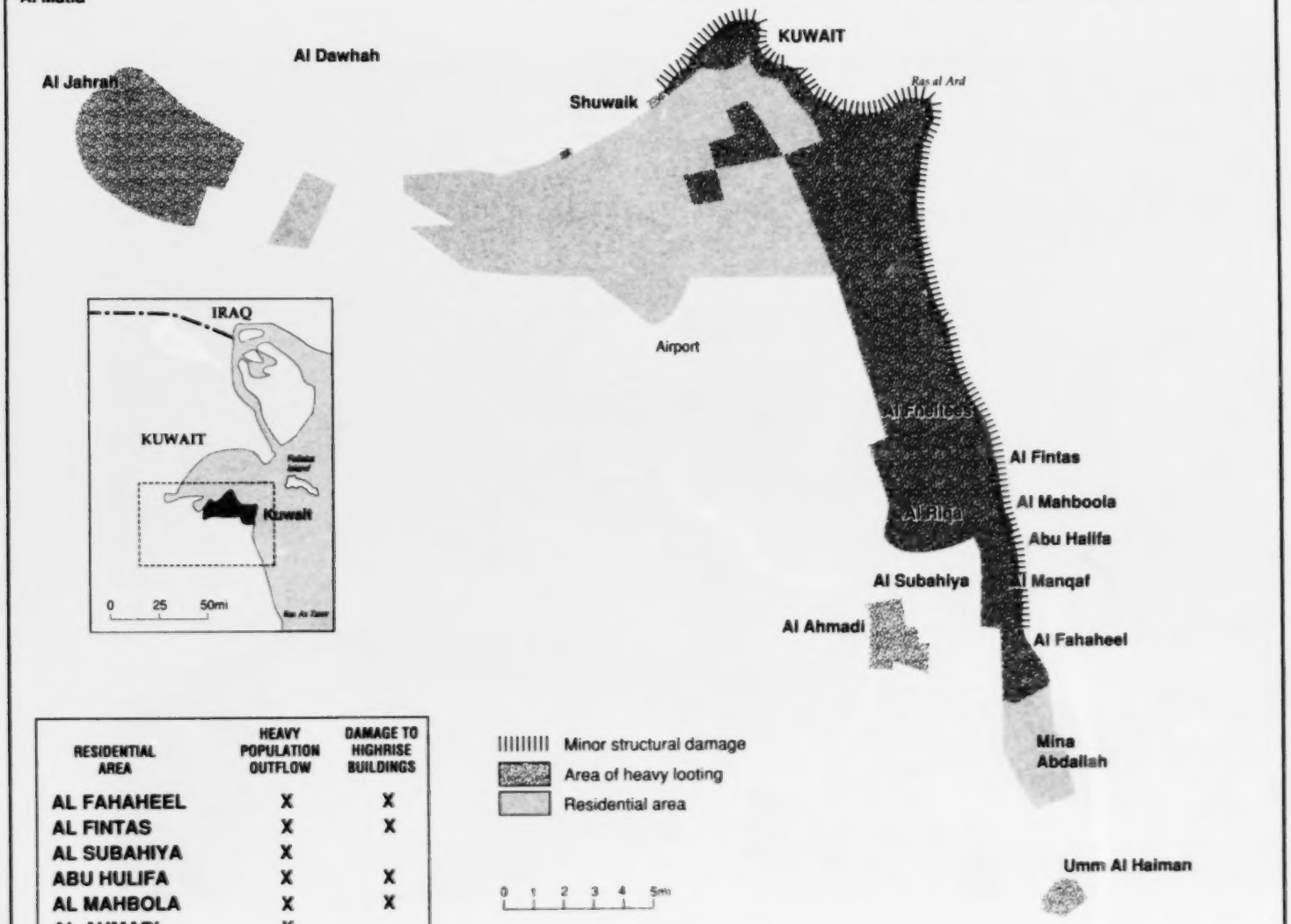




CONDITION OF RESIDENTIAL INFRASTRUCTURE



RESIDENTIAL AREA	HEAVY POPULATION OUTFLOW	DAMAGE TO HIGHRISE BUILDINGS
AL FAHAHEEL	X	X
AL FINTAS	X	X
AL SUBAHIYA	X	
ABU HULIFA	X	X
AL MAHBOLA	X	X
AL AHMADI	X	
AL JAHRAH	X	

MAP NO. 3631.15 UNITED NATIONS
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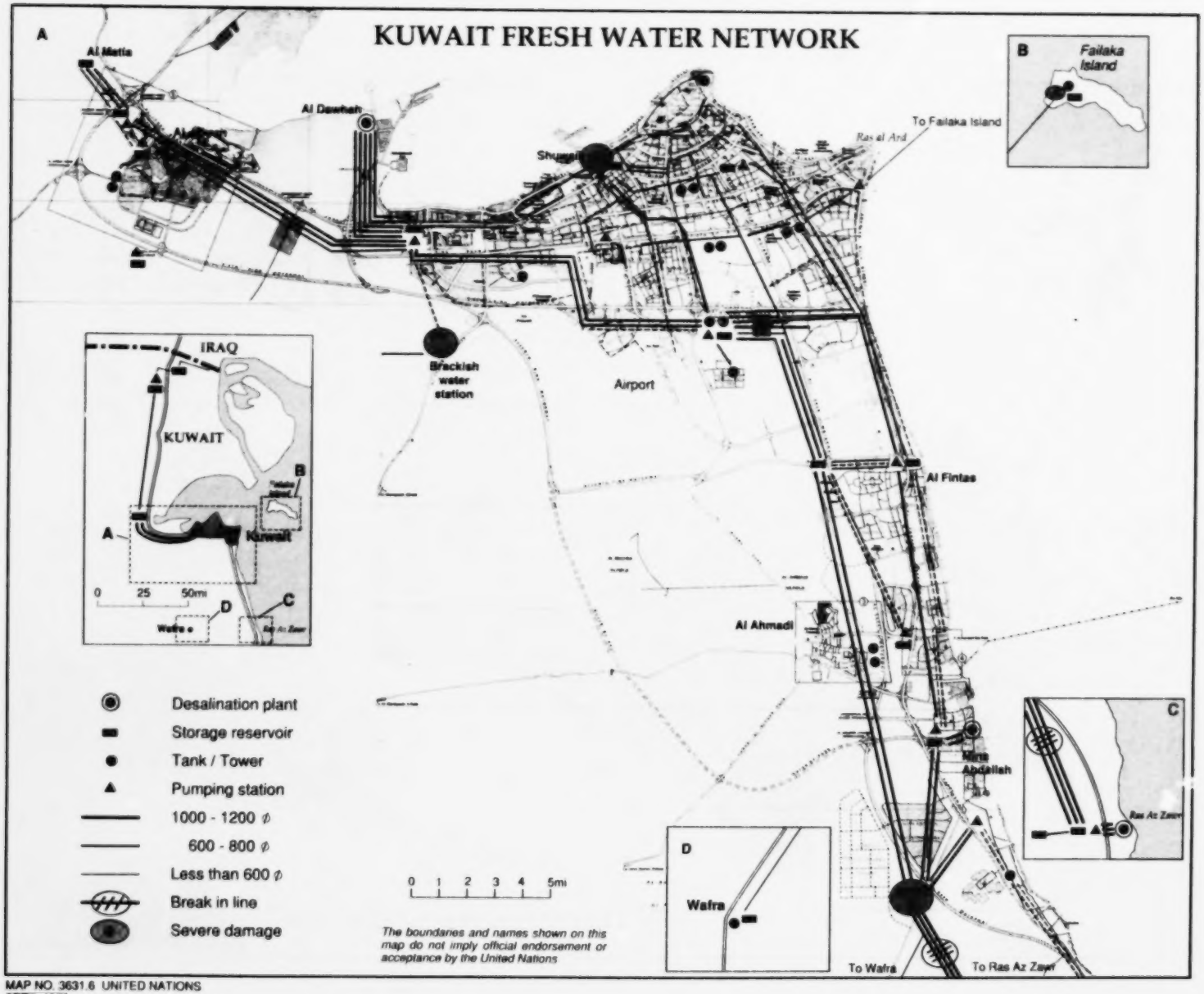
Map 10



MAP NO. 3631.6 UNITED NATIONS
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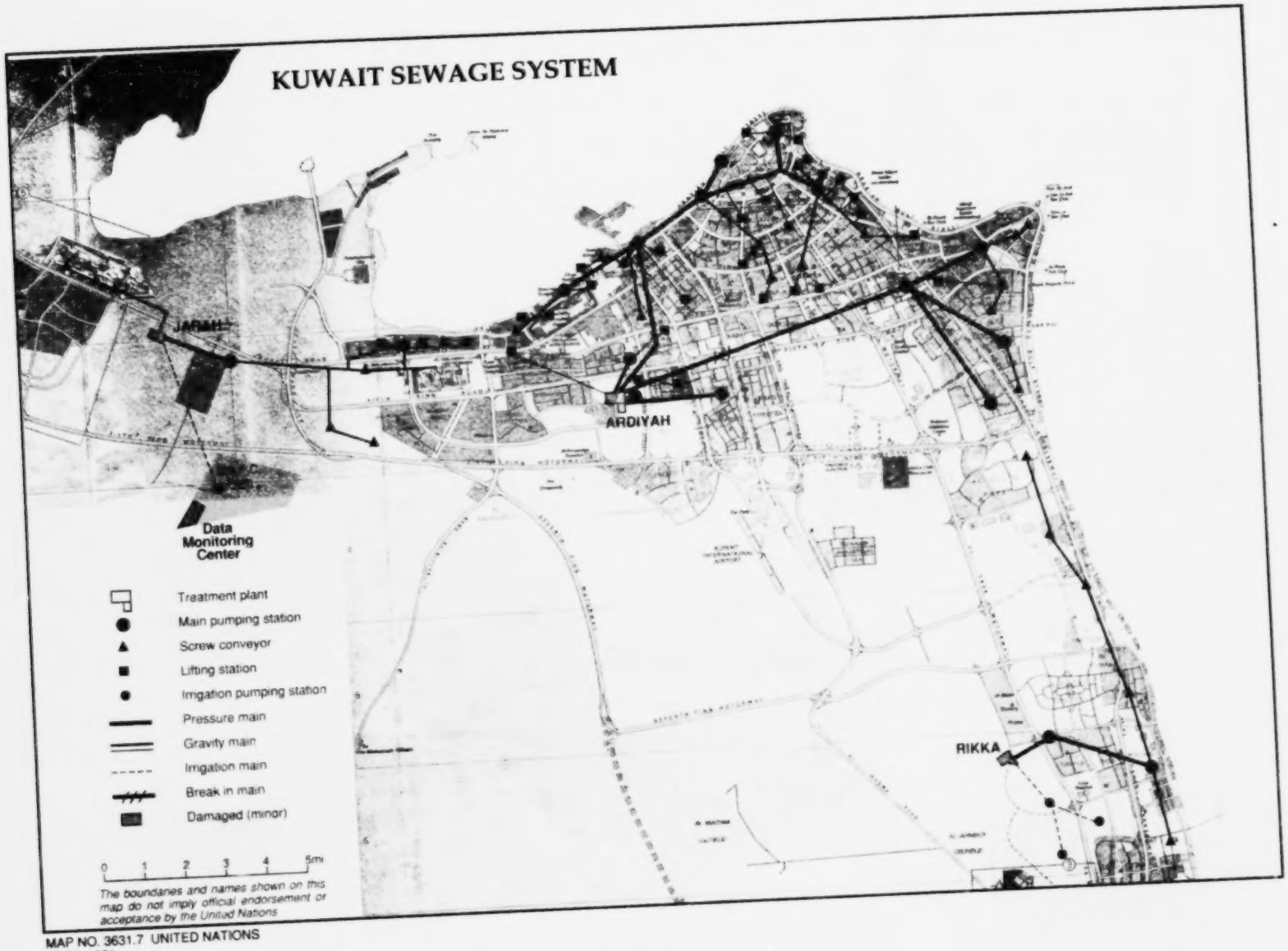
Map 11



MAP NO. 3631.7 UNITED NATIONS
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Map 12

VIII. SOCIAL SERVICES

A. Health system

1. Situation before 2 August 1990

422. Kuwait had until August 1990 achieved one of the highest health standards in the world. It had a crude death rate of 2.4 per 1,000, an infant mortality rate of 16.3 per 1,000 live births and a life expectancy at birth of 71.2 years and 75.5 years for males and females respectively. As communicable diseases and other main contributors to childhood morbidity and mortality were brought under control, the national health services had gradually expanded their scope by creating diagnostic and treatment facilities for non-communicable diseases, which required a constantly increasing level of technical sophistication and resources. This was reflected in the number and the quality of fixed health facilities, the efficiency of the emergency medical care and the creation of centres specializing in such areas as oncology, nephrology, organ transplant, open-heart surgery and neonatology.

423. Six regional and nine specialized hospitals, 74 polyclinics and several medico-social institutions provided medical, surgical and dental care and rehabilitation services to the entire population, free of charge. Private health facilities complemented this extensive network. Nearly 10,000 nurses (of whom 90 per cent were foreign workers) and more than 3,200 physicians (of whom 80 per cent were foreigners) provided these services, with a ratio of physicians and nurses to population which compared favourably with most industrial countries in the world.

2. Assessment of damage

Personnel, administration and the Faculty of Medicine

424. The immediate effects of the invasion of Kuwait were the departure from the country of thousands of expatriate health workers, followed by the destruction or removal by the occupying forces of large amounts of equipment and supplies, particularly in sophisticated fields.

425. The Ministry of Public Health was made inoperative soon after the invasion: many staff members left the country and others did not report for work. The building of the Ministry, situated on the sea-front, was transformed into a fortress with large stocks of ammunition stored on its ground floor.

426. The inspection by the mission showed that there was not a single room of this building left untouched: ceilings had been destroyed, files and documents had been strewn on the floors, corridors and staircases. Computers and typewriters had been taken away. During the occupation, the Ministry of Public Health was relocated at the Ibn Sina Hospital, where it had great difficulty in carrying out its directing and coordinating roles due to

shortage of managerial staff, lack of communications and the absence of administrative and financial infrastructure.

427. Certain public health programmes suffered particularly severely during the occupation. The epidemiological surveillance system which had been very effective in monitoring disease trends, was seriously affected by the decision of the Iraqi authorities to close down certain facilities, partly as a result of the loss of personnel and by a stated intent - as reported by health staff interviewed - to align the health care services with those that existed in Iraq.

428. This situation was aggravated by the removal of all equipment from the Public Health viral laboratory. At the time of this mission, the surveillance system had come to a standstill. There was no data flowing through channels and it was deprived of reliable sources of information and the necessary computer equipment to process it. Systems to detect the possible reappearance of malaria or other vector-borne diseases or the occurrence of air and water pollution related illnesses no longer functioned.

429. The Faculty of Medicine prepared 90 to 95 physicians each year over a seven-year curriculum. It offered post-graduate training in clinical and public health specializations. It also conducted operational research projects on issues relevant to national needs and basic research. The Faculty had a teaching staff of 170, 8 to 10 per cent of whom were Kuwaitis. The laboratories offered a broad range of specialties. The library, apart from having a wide collection of books, subscribed to over 1,300 periodicals.

430. During the occupation, particularly in October and November, the Faculty was looted of all its electro-medical, audiovisual and other stationary equipment. The library and computers were also removed. At the time of the mission's visit, the Faculty was closed; 95 per cent of the teaching staff had left the country and there was complete uncertainty as to when it could be re-equipped, restaffed and reopened.

General hospitals

431. There are six general hospitals in Kuwait, each with a bed capacity ranging between 400 and 500 beds. All were surveyed by the mission. The equipment and staffing of these hospitals compared favourably with those of industrialized countries. The occupation had two effects on these facilities. Firstly, a large proportion (nearly 80 per cent) of the nursing staff left the country, most of them within the first three months after the invasion. Two thirds of the physicians fled the country and others were taken to Iraq under an "exchange programme" that would provide for their replacement by Iraqi physicians. Secondly, the extensive and modern equipment of these hospitals, particularly in the electro-medical field, was either removed from the country, or exposed to damage as a result of the lack of maintenance and skilled personnel to operate it.

432. The depletion of personnel can be illustrated by the example of the Al-Amiri Hospital, which saw its number of physicians reduced from a pre-invasion level of 160 (including 60 surgeons) to 8 (including 5 surgeons). Meanwhile, the number of nurses fell from 540 to 60 and this compelled the hospital to close down 10 of its 12 wards. The Mubarak Alkabeer Hospital lost 60 per cent of its medical and nursing staff and was, at the time of the mission, functioning at 48 per cent capacity after having enrolled medical students and volunteers to assist the remaining personnel. It was at that point the only functioning intensive care unit in the country out of the original six. Only 3 of the 5 operating theatres and 7 of its 18 wards were functioning during the occupation. The Jahra hospital, with a capacity of 500 beds, had to be closed as its number of physicians fell from 300 to 45, nurses from 400 to 30, and laboratory and other technicians from 120 to 25.

433. The physical structures of the general hospitals were not significantly affected but some of the fixed equipment items had been taken away while others had ceased to function owing to lack of maintenance and lack of repairs. Because of the absence of reliable electrical supply, several hospitals had not attempted to put back into operation the most sensitive elements of their equipment. A complete check would be required before the full extent of the damage caused to the equipment can be fully assessed and remedied. A list of missing or destroyed equipment suffered by all institutions was made available to the mission through the Ministry of Public Health.

Specialized hospitals

434. The mission visited all the nine specialized hospitals in the country, which serve as tertiary-care referral facilities and operate outpatient clinics.

435. The Infectious Diseases Hospital is a 220-bed facility with 7 wards whose bed occupancy rate averaged 50 per cent, and never exceeded 70 per cent, during occupation. Two of its wards were hit by bombs, causing structural damage and loss of equipment. There are now 5 wards that are functional with a total of 150 beds but only 30 are actually used owing to reduction in demand, lack of water and electricity and the shortage of personnel. The occupation resulted in a reduction in staff from 24 physicians to 6, 12 laboratory technicians to 4 and 170 nurses to 18. Equipment in the laboratory and the X-ray department has suffered from lack of maintenance and repair.

436. The Gastroenterology Centre attached to Al-Amiri hospital suffered minor damage to its four-storeyed building. However, a large amount of equipment was taken away by the occupying forces: the monitoring equipment of the first floor recovery-room and the endoscopy equipment in five of the six specialized rooms. Major damage had been caused to the laboratory, with some of the heavier equipment having been dismantled, and the ultrasound room was emptied of its apparatus. At the time of the mission's visit the hospital was closed in preparation for major refurbishing and re-equipment.

437. The Kuwait Cancer Control Centre was a diagnostic, treatment and research centre that provided services to persons from Kuwait and from other countries in the region. The Centre includes three departments: surgery, radiotherapy and chemotherapy. Its laboratories of haematology, histology, tumour markers and tissue culture ceased operation shortly after occupation. The maintenance of equipment was usually done between June and September and, owing to the absence of such services in 1990, a linear accelerator, one of the two Cobalt machines, and a CAT scan had stopped working and had yet to be put back into service. With its diminished diagnostic and monitoring capability, the Centre saw its attendance decline.

438. While no damage was caused to the structure of the Al-Razi Orthopaedic Centre, it was left with only two qualified orthopaedists. As the number of physicians fell from 80 to 20, the number of nurses from 200 to 50 and the number of support staff from 200 to 70, the Centre could perform only three operations a day as against 10 earlier. All ambulances had been removed from the hospital. The most acute problems were the shortage of staff and the lack of electricity and water.

439. The Centre for Organ Transplant had once harboured a complete dialysis centre and surgical units in a modern building situated within the Al-Sabah complex. Doors, windows and part of the roof of the building had been damaged. Most of its equipment had been removed, including the dialysis machines, electro-medical apparatus and much of the furniture and equipment from operating and intensive-care rooms. Floors had been littered with patients' files, registers and small equipment. Some of the rooms could be inspected only from the threshold as live ammunition scattered around the site had not yet been removed by explosives disposal teams.

440. Only 8 per cent of the 476 beds in the Maternity Hospital are currently used. The main factor is the scarcity of personnel: 50 nurses and midwives out of the initial 576. Volunteers are currently providing assistance in administration and patient care. Five out of 87 incubators had been removed. The other incubators and the entire intensive care unit were not being utilized because of insufficient staff resources.

441. The Psychiatric Hospital comprised the main hospital unit with 567 beds and 18 out-patient clinics. The drug addicts' clinic was vandalized soon after the occupation. The number of medical officers was reduced to 6 from 64 and nurses from 330 to 96. Of 19 wards, only 8 were operational, with 225 beds.

442. The Institute for Islamic Medicine, which operates from a modern building and includes a mosque, was within the range of artillery fire in August 1990 when invading forces were faced with Kuwaiti resistance. This building was damaged by several shells, one of which perforated the base of the minaret. The Institute had been emptied of its contents, which included a library, benches for laboratory work and furniture.

443. The Allergy Hospital provides allergy tests as well as desensitization to ambulatory patients. At the time of the mission's visit, the environment, food and pulmonary functions were out of service. The hospital and its store were vandalized and medical as well as other equipment, including telephones and the telephone switchboard, had been removed.

444. The Chest Hospital has two sections, one for tuberculosis and one for thoracic and cardiovascular surgery. Fifty-four medical officers were on the staff before the occupation. At present neither cardio surgery nor thoracic surgery can be performed because of the scarcity of nurses and absence of cardiology surgeons.

Polyclinics and other services

445. There were 74 polyclinics providing different preventive and curative services to the Kuwaiti population before the invasion. At the time of the mission, only 11 polyclinics were operational at different levels. Primary health-care components with some specialty clinics were provided in these centres. There were also 547 school health centres, none of which were operational as all schools were closed. Most laboratories, though staffed, could not provide any service owing to lack of water and electricity. In the Hawalli region, seven polyclinics were only partly operational, mainly because of insufficient staff and lack of priority supplies and equipment: immunization, preventive and curative health care were provided to pregnant women, mothers and children as well as to diabetic and hypertensive patients. Some of the clinics, such as the Salmieh and Rumay Third polyclinics, had not resumed activities.

446. The physical structure of most health centres was in operational status, although doors and windows had been forced and furniture partly damaged. Portable equipment had been taken away.

447. The Kuwait Dental Centre comprised two sections, one of which had been renovated only a year before occupation. A great deal of its equipment had been removed, including dental chairs. Of the 350 dentists in the country prior to occupation (both generalists and specialists), 110 remained.

448. The Kuwaiti Society for Handicapped Children is a seven-floor building comprising three floors for children's accommodation. There were 135 residents, all severely handicapped mentally or physically. The Society also provided a day-care centre for 40 children. It normally closed in July/August, during which period both resident and day children stayed with their families. At the time of the invasion only 18 of the 165 children remained at the facility.

449. The occupying forces placed artillery equipment around and on the top of the facility. By January the staff was compelled to vacate the building as the children were terrified by anti-aircraft fire. The original building was looted, and doors leading to the nursing quarters were broken.

Diagnostic equipment, hospital laboratories and blood bank

450. The six general and the nine specialized hospitals were well equipped with modern diagnostic equipment of a standard that compared favourably with that of industrialized countries. There was sufficient staff to operate, maintain and repair this equipment and there were stocks of small supplies and reagents needed for this purpose.

451. The medical school laboratories provided a more extensive range of investigations and were used both as referral laboratories and a training site for medical, nursing and medical-engineering students. All diagnostic equipment was serviced by private companies represented in Kuwait through specific service agreements.

452. During the occupation, most of the equipment became non-functional as specialized staff left and spare parts were gradually exhausted. The local branches of firms that customarily serviced the equipment closed business after the withdrawal of their staff from the country. The virology laboratory of the Ministry of Public Health and the laboratory and X-ray equipment of the Organ Transplant and Gastroenterology Centres as well as all support laboratories of the Faculty of Medicine were removed.

453. Basic and simple diagnostic procedures were being provided at the time of the mission but physicians were obliged to rely largely on clinical diagnosis and had to refer cases needing specialized investigations to other countries.

454. The Central Blood Bank was originally established in 1965 in the Al-Amiri Hospital laboratories. It moved to well-equipped, new premises in the Jabriya area in 1987. It provided blood and blood products to all government and private hospitals in Kuwait. Blood was obtained from voluntary donors. By mid-1989, Kuwait had become totally self-reliant in blood and blood products. The Central Blood Bank was totally equipped for blood collection, testing, plasma fractionation and conditioning. There were sufficient cold rooms, supplies and a network of voluntary donors to meet regular demands. A stock of 1,000 pints was maintained in reserve. Blood collections were tested for human immune deficiency virus (HIV), haemoglobin and antibodies routinely.

455. During the invasion, the number of personnel dropped from 107 (17 administrators and 90 technical staff) to 50 (10 administrators and 40 technical staff). Some equipment and vehicles were taken away by occupying forces but the Central Blood Bank remained operational throughout the occupation. At the time of visit, it was functioning, but the lack of donors had brought the reserve of blood units to below the prescribed level of 500. Diagnostic reagents were lacking, as was the supply of certain common blood groups.

Essential drugs and ambulance services

456. Before the invasion, drugs and small medical supplies were procured through a semi-autonomous company. The Central Medical Store remained

functional during the occupation but an estimated 60 per cent of the existing stock with a total estimated value of KD 13 million was reportedly taken to Iraq. The computerized system that enabled the Central Medical Store to process the supplies was paralysed by the lack of maintenance, repairs and computer operators. Limited quantities of drugs were also taken away from central pharmacies of hospitals but the stocks remained by and large sufficient to cope with the demand, with the exception of certain specialized drugs for the treatment of metabolic and cardiovascular diseases.

457. The drug quality control laboratory was almost completely emptied. What was left was a small amount of glassware, chemicals and a few pieces of equipment. All records had disappeared. The animal house had been emptied and destroyed. The rest of the building was intact.

458. The country's ambulance service was modern and quite extensive. There was a central system for receiving calls 24 hours a day and dispatching ambulances from a central base situated on the outskirts of Kuwait City. The services consisted of a fleet of 170 vehicles including 4 large mobile intensive care units. The fleet of ambulances was assigned to 22 centres in the country, including the 6 regional hospitals. Soon after the occupation, the fleet was confiscated and sent to Iraq or allocated to the occupation forces. The central wireless system to which the ambulances were linked was removed. This resulted in a severe disruption of services.

Overall assessment

459. At the time of the mission, Kuwait was faced with acute difficulties stemming from its prior dependency on expatriate health personnel, the majority of whom had left the country, as well as with challenges created by an adverse environment. The population was somewhat unprepared for a lifestyle so in contrast to the secure conditions that it had previously enjoyed. Health hazards were generated by air pollution, water scarcity and the large amount of explosives scattered in and around populated areas. Of the six regional hospitals, one was closed owing to a shortage of nursing personnel and the non-availability of electricity and water. The others operated at reduced capacity, in the range of 10 to 20 per cent for most of them. The damage caused to the infrastructure, the removal of equipment, the reduction in labour force and the lack of electricity and water had critically affected the provision of care.

460. The occupation of Kuwait had also depleted the country of its trained electro-medical technicians and of the spare parts needed for the repair of diagnostic laboratory, X-ray and other modern apparatus. As a result, diagnostic investigations and monitoring tests were brought to a minimum and the clinicians had to depend heavily on less reliable and precise clinical diagnoses.

461. The short- and long-term effects of pollution arising from the oil-well fires called for complementary monitoring systems, some aimed at the measurement of environmental parameters, others at the trend of selected

diseases, signs or symptoms. The air and water monitoring stations had not begun operation at the time of the mission's visit because of the lack of electricity and the loss of equipment. Unfortunately, the vast amount of ordnance scattered throughout the country and the large number of mines in populated areas have caused a high number of injuries, particularly among children and adolescents. The danger posed by the mines will be accentuated when the major part of the population now abroad returns to its homes. The psychological impact of the occupation on children and its effects upon the mental health of both returning prisoners-of-war and civilians taken forcibly to Iraq require a special programme for counselling, readaptation and rehabilitation.

462. In parallel with the damage assessment mission, WHO and the United Nations Children's Fund (UNICEF) worked closely with the Ministry of Public Health to elaborate an emergency response plan of action to take immediate effect. This will include such activities as the monitoring of air, water, marine and land pollution and prevention and control interventions to minimize the impact of pollution on the health of the community.

463. A UNICEF team provided the mission with a copy of the agency's recent report dealing with the health and nutritional needs of children in Kuwait. It has been suggested by a UNICEF child psychologist that the violence, stress and anxiety generated by the war had caused childhood trauma and loss which will necessitate both short- and long-term rehabilitation programmes.

464. In the view of the mission, the rehabilitation of the health system could take at least a full year before it is restored to the capacity and standards prevailing before the occupation. This will, of course, be contingent on resources and staff being made available.

B. Education, culture and information

1. Education and research

(a) Situation before 2 August 1990

465. The Government of Kuwait placed great importance on the development of education and the preservation and enhancement of Kuwaiti culture. The country's educational objectives were to introduce students to their Islamic Arab heritage, to the history of Kuwait and the development of its society and traditions, as well as to promote the ability to think according to scientific methods. These objectives were effectively translated into practice in an educational system that gave balanced attention to the past and the future, to letters and science.

466. Education was free through the secondary level to Kuwaitis and non-Kuwaitis alike. The educational structure began with kindergarten, followed by four-year stages for primary, intermediate, secondary and university. In 1989/90, 512,515 pupils and students were enrolled in

kindergarten through secondary school. In all, 73 per cent of the total attended public schools, and 43 per cent of the total were Kuwaitis. Technical colleges provided two years of specialized education and teacher training of four years' duration. Technical training of one year followed intermediate classes. Technician and teacher training enrolments were around 12,000, while university enrolment was 14,106, of which 10,105 were Kuwaitis.

467. The Kuwait Institute for Scientific Research, created in 1967, conducted scientific research particularly in support of national industries and environmental protection. It served government and industry by following up scientific and technological achievements world-wide. The Kuwait Institute for Scientific Research, occupied a new facility in the Shuwaikh area, built in 1986 at a cost of KD 24 million, as well as two field stations, all constructed, staffed and equipped to world-class standards.

468. Many Kuwaiti professors from the Science and Engineering Faculties of Kuwait University held joint appointments with the Institute. The University laboratory buildings are older than those of the Institute, but equipment standards are the same. The annual equipment budget of the Science Faculty alone amounted to KD 1.5 million. Under the University's community service policy, a great deal of university research was performed in service to the Government.

469. The Arts, Law, Shariah, Education and Commerce Faculties were moderately equipped and pursued cooperative programmes with European universities. The Medical and Allied Health Faculties worked in close cooperation with the Mubarak Hospital, and the Medical Faculty cooperated internationally in its research.

470. Technician-level training was on the upswing in Kuwait, and had reached 12,000 students and trainees in 1990, distributed between four colleges (business, technological studies, health studies, and basic education) and four training centres (telecommunications and air navigation, electricity and water, industrial training and special sessions). All colleges and training centres had been updated recently with state-of-the-art equipment and, in some cases, new buildings.

471. In 1990, the country had 633 public and 337 private general education institutions. The private schools received subsidies from the Government, but mainly served the non-Kuwaiti population. The teaching staff in public primary schools was 74 per cent Kuwaiti, but this figure dropped to 33 per cent for intermediate schools and 20 per cent for secondary schools.

472. Libraries - even at kindergarten level - were generously stocked, classrooms well provided with visual aids and laboratories fully stocked with equipment and supplies. The major educational and research establishments are shown in map 13.

(b) Assessment of damage

473. During the occupation, the life-blood of Kuwait's research establishment was drained. Twenty years of accumulated research data by the Kuwait Institute for Scientific Research researchers and the University professors has been taken away, burned or reduced to litter. The mission's inspection showed that lecture notes, research data and personal technical libraries are missing. The entire libraries of the Institute and all the nine university faculties, totalling over 300,000 volumes and 8,300 periodical titles and a quarter of a million technical reports on microfiche, have been removed, reportedly by truck to Iraq. The books, manuscripts and files of four widely read journals published by the Faculties of Arts and Law have been plundered or destroyed.

474. The sophisticated equipment used for generating the research data is also gone. At least two very large mainframe computers have been taken - an IMB 3090 from the Kuwait Institute for Scientific Research and a large VAX machine from the Central Services of the University. This loss includes the data of the Kuwait Institute for Scientific Research's National Science Information Centre. Smaller mainframes have been taken from the Faculties of Science and Engineering and, complete specialized teaching laboratories in psychology, languages, commerce and geography are gone. Costly spectrometers, centrifuges and virtually every other sophisticated machine and instrument have been taken from the science and engineering laboratories, while all faculties together have lost more than 1,000 personal computers. Typewriters were removed on a massive scale.

475. Over all, there has been a mass removal of equipment. The June 1990 book value of that belonging to the Kuwait Institute for Scientific Research was KD 22 million, and the University inventory is far larger. The removal was systematic.

476. The institutional files of all University faculties were thoroughly ransacked, making it difficult to establish lists of lost equipment and accessions and virtually impossible to re-establish records of students, staff and financial matters.

477. All modern furniture has been taken from classrooms, offices and meeting rooms. Even non-academic spaces were plundered. The University sports stadium had 20,000 plastic seats removed. Virtually all buildings have been defiled and minor damage inflicted to finishes, as well as to electrical and plumbing systems, which may be valued at 10 per cent of replacement costs. Fires were set selectively in both the University and the Kuwait Institute for Scientific Research. Gun-fire was intentionally aimed at the latter's main building, causing some structural damage. Restoring the Institute's building will require around 50 per cent of replacement value for burnt areas and blast-damaged areas and 10 per cent elsewhere.

478. The treatment meted out to the technician and teacher education colleges and training centres was similarly destructive. As part of a new priority

programme of the Kuwaiti Government, the colleges and training centres were benefiting from substantial investments in equipment and new buildings. The mission's examination of the premises of these eight institutions showed a degree of thoroughness in the plundering not found in other educational establishments. It is no exaggeration to say that 99 per cent of technical equipment and new furniture was taken, including perimeter laboratory benches. The 1990 book value of the equipment is not known, but the combined total may be more than the value of the equipment of the Kuwait Institute for Scientific Research. Buildings suffered damage in the order of 5 per cent of replacement cost. The Technical College was converted into an ammunition depot, and the Basic Education College for Girls suffered bomb damage judged to be about 15 per cent of replacement cost and files were largely destroyed.

479. The mission found the schools in a state of disrepair and with interiors defaced by graffiti. Some glass had been broken, air-conditioning units had been wrenched out, electrical systems damaged and water taps removed. Those public schools used as military headquarters suffered the most but, on the basis of survey data available at the time of the mission, almost every school suffered from occupation and ransacking. Field observations by the mission indicated that perhaps as many as 15 per cent of the schools have been moderately damaged by fire or explosions, and some 2 per cent have been completely destroyed. It appears that private schools have suffered less from organized removal of furniture than have public schools. Didactic equipment losses are 100 per cent, furniture losses at around 50 per cent.

480. Looked at as a whole, it seems the most serious damage has been done to the research capacity of the country. A whole new information system needs to be developed that will replace lost books, microfilms and microfiches and electronic data. Furthermore, the University and research institutions will have to reinstall many new laboratories and replace virtually all of their furniture and equipment. Required building repairs range from 10 to 20 per cent of the value of new buildings. Where fires have taken place, repair costs may be as high as 50 per cent and, where major destruction has occurred, 100 per cent.

481. Education has already lost one vital academic year. General education is expected to resume later in 1991. However, applied education institutes and colleges could lose a total of one and a half to two years, and university faculties from two to three.

2. Culture

(a) Situation before 2 August 1990

482. An important objective of the Kuwaiti Government has been the promotion of activities relating to the culture of the Islamic world and of all Arabs. Kuwaiti identity was seen as a part of this broad picture.

483. As much of the Islamic tradition is embodied in ancient manuscripts, this was an area in which many Kuwaiti institutions took an interest. For example, the Central State Library held private collections of some 8,000 rare or unpublished materials, and the Department of Arab Heritage of the National Council for Culture, Arts and Literature had collected microfilms of some 25,000 titles, in addition to 1,600 original manuscripts, a library of 10,000 volumes and a special collection of 150 illuminated pages from historic manuscripts. The Educational, Cultural and Scientific Organization (ALECSO) of the League of Arab States (LAS) located its Institute of Arabic Manuscripts in Kuwait. This institute searched out from libraries around the world, as well as from private collections, manuscripts covering religion, history and culture. These were studied by scholars, catalogued and incorporated in published bibliographies. Certain important texts were reproduced for wide dissemination.

484. The Central State Library, established in 1935, had acquired a collection of 95,000 titles in all fields, plus a unique collection of traditional Islamic and Arabic music recorded on tape, supported with a display of musical instruments. It also held tapes of important seminars and lectures given in Kuwait. To bring this knowledge to the neighbourhoods, the Central State Library, in cooperation with the Ministry of Education, had supported the creation of 22 neighbourhood libraries, which held a total of 293,000 volumes. Development of a centralized electronic catalogue linking all these libraries was under way and a pilot project already launched. The Kuwaiti National Commission for UNESCO served as an information centre for UNESCO publications and had a specialized library of some 3,000 titles.

485. The location in Kuwait of specialized regional institutes brought in a wide knowledge base, which was available not only to Kuwaiti scholars but also to other scholars visiting the country. These institutes were the LAS Arab Institute for Planning (with roughly 50,000 volumes in its library), the headquarters of the UNESCO Educational Innovation Programme for Development in the Arab States (EIPDAS) (5,000-10,000 titles), and the Gulf Arab States Educational Research Centre, sponsored by ALECSO, which held a specialized library on curriculum development that was considered outstanding in its field.

486. It is impossible to quantify or determine precisely the number of personal libraries and collections that many Kuwaiti scholars maintained in their homes. These included rare books and manuscripts, as well as more general information. Access to these collections was limited, but some of the owners generously opened them for use by other scholars, neighbours and close friends.

487. In developing its National Museum, Kuwait set out to create an institution of which the nation could be proud. The archaeological finds at Faylakah Island gave evidence of cultures from the Stone Age through the Bronze Age and Hellenistic Period to the Islamic Period. Objects from these finds were professionally displayed in the new Museum buildings. The ethnology collection presented traditional Kuwaiti life, including that of the Bedouin, seafarers and town-dwellers. A well-preserved boom (dhow) proudly proclaimed

Kuwait's tradition in maritime trade, and was a gathering point for national day celebrations. A gallery of contemporary art and a planetarium were further attractions. A branch museum was located on Faylakah Island, and about 120 items were on loan for display at the airport.

488. Important private collections were also publicly displayed. The most important of these, the Islamic Antiquities Collection (Dar al-Athar al-Islamiyah), also known as the Al-Sabah Collection, was located in the National Museum building, but owned by a member of the royal family. The collection contained over 20,000 items covering a time-span of 12 centuries. The Al-Sedu Society maintained an attractive, dynamic display of Bedouin weaving and objects in an old house that had been incorporated into the Museum grounds. The Museum and the Al-Sedu Society cooperated in giving courses in crafts and restoration work.

489. The immovable cultural heritage of Kuwait had been rapidly declining as old buildings were demolished to make way for the modern Kuwait. In 1988, the Kuwait Municipality published a Kuwait historical preservation study and a list was established officially protecting 122 sites. Included in this list were old houses and palaces, early institutional buildings, the old Kuwait City souks and the five gates that are remnants of the 1920 city wall. Among the notable structures were the old National Museum building adjacent to the Dasman Palace and the Al-Badr and Al-Sedu houses inside the National Museum grounds. The remaining area of the old Kuwait City souk had been acquired by the Ministry of Information to ensure its preservation. New construction in the area was under way, but under carefully controlled conditions where the designs were based on the old buildings they replaced.

(b) Assessment of damage

490. As far as the mission could determine through several on-site inspections, there are probably no public or institutional libraries of any importance left in the country.

491. The mission visited 19 libraries of various sizes and found that the removal of the major libraries and specialized collections was organized and the transfer orders rigorously executed. The Central Library collection, with its card catalogue, was removed beginning in December 1990. The microfilm collection of the Department of Arab Heritage was destroyed by malicious water damage to the building. Its library, original manuscripts and illuminated manuscript pages were damaged and require the urgent assistance of a restoration specialist. Smaller libraries, such as the neighbourhood public libraries and school libraries, lost a portion of their collections.

492. All libraries and institutes have been severely affected by the vandalizing of records. The major libraries had furniture and bookstacks removed, and virtually all libraries have been entirely stripped of computers and other specialized equipment. The Central Library's collection of old musical instruments has disappeared, although the instrument cases were left behind.

493. The mission was informed that the National Museum was broken into on 27 September by the occupation authorities. In the final week of the occupation the Museum was gutted by fire, which reduced the planetarium projector to a stark black hulk in a charred room, while the boom (dhow) was burnt so completely that only ashes and twisted metal remain where it once stood. The objects that had been stored at the Faylakah Island branch of the Museum awaiting display are missing; those already on display at Kuwait International Airport were looted.

494. The private Al-Sabah Islamic Antiquities Collection, located in the Museum buildings, was looted in its entirety, along with the Museum's own collections. The Al-Sedu house was also plundered, and much of the remaining contents destroyed by rain.

495. Cultural sites seemed to have been damaged at random. On first inspection, the Faylakah archaeological site appears to have survived unscathed, but further investigation will be necessary. However, three historic structures in Kuwait City were heavily damaged. The Al-Maqsab Gate was completely demolished, reportedly by a large vehicle ramming it from three different directions. The oldest buildings in the old Kuwait City souk were partially pulled down during the final weeks of the occupation. The extensive damage done has destroyed the roofs and upper floors of all structures. The old Museum building (the Al-Jaber Palace) has also had its roof and part of its walls blown off or burned.

496. Over all, the losses in the cultural area are immense - not just for Kuwait, but also for the Islamic world and the world as a whole. Much of the loss is of priceless heritage objects and materials. Tragically, the Museum's complete record of items in its possession was destroyed by fire. However, at the time of the suspension of hostilities, the Iraqi Government indicated to the United Nations that the cultural items would be returned. The Kuwait Government has given the mission a partial list of the archaeological objects that had been held by the Museum. This has been handed to UNESCO so that it can take action to prevent the acquisition of these objects by other museums. Published bibliographies of the Central Library have also been received.

497. Other actions to be taken include restoring the Museum's buildings and interiors and replacing furniture and equipment. The damaged historical buildings pose a special problem. If they have been well-documented, they can be rebuilt in their old form. Their restoration cost, however, will be at least two to three times the cost of typical modern structures.

3. Information

(a) Situation before 2 August 1990

498. Kuwait's radio and television services had in recent years undergone a modernization of equipment and had boosted transmission to cover not only Kuwait but also most Gulf States, and in the case of Radio Kuwait, as far afield as the Americas, Australia, the Far East and South-East Asia.

499. Radio Kuwait has been in existence for almost 40 years. Prior to the invasion, it transmitted programmes in four languages for 63 hours daily, covering primarily the Gulf region, but with special programmes reaching most parts of the world. It had a number of powerful transmitters ranging from 250 kilowatts to 750 kilowatts. The main transmitting station was located at Kabd, with two smaller ones at Maqwa and Jaiwan. It also had four fully equipped mobile broadcasting stations.

500. Kuwaiti Television was inaugurated in 1957. Prior to the Iraqi invasion, it reached most of the Gulf States, with two channels broadcasting 90 hours weekly. Some 80 per cent of programmes were locally produced and 20 per cent were foreign. It had four major fully equipped modern production studios and three broadcasting studios. The main transmission stations were at Mutla, Faylakah and Rawdhatayn. It also had seven mobile transmitting stations.

501. The Ministry of Information was also a driving force in the up-and-coming publishing industry of Kuwait. The government press put out at least two important journals - the weekly Huna Al-Kuwait, the official gazette (Al-Kuwait Al-Youm) and the monthly Al-Arabi, which had a regional circulation of 350,000 copies. In addition, it published textbooks and monographs on poetry, politics and other subjects. Production of these materials was largely carried out in the Ministry's own printing plant, which was in the process of modernization. New printing equipment had arrived but had not yet been uncrated.

502. In addition, prior to the Iraqi occupation, Kuwait had one of the most thriving private presses in the Arab world. Periodical titles covered popular subjects, but also included professional journals. Seven daily newspapers were published, several of which had an international readership.

(b) Assessment of damage

503. A visit to the Kabd short-wave transmitting station showed that the buildings have been damaged. The remains of a number of 500-kilowatt transmitters and one 250-kilowatt transmitter were seen. The antenna network has also been damaged. The Kuwaiti authorities informed the mission that four new 500-kilowatt transmitters, which had recently been installed in the station, had been dismantled and carried away by the occupation forces. The cost of replacing the equipment will be high.

504. The building housing the Kabd medium-wave transmitting station has also been destroyed, and its transmitters, power-generating station, as well as two of the station's antennas have sustained severe damage.

505. The mission also visited the Maqwa transmitting station. The building was found to be severely damaged. Equipment has been looted. According to the Ministry, their transmitters were dismantled and stolen.

506. The transmitting station at Jaiwan has sustained minor damage to the building, as well as to its office furniture and equipment. No damage appears to have been sustained by the medium-wave transmitter or by the microwave unit and antennas.

507. The mission also visited the Ministry of Information complex in Kuwait City to inspect damage to the building as well as to the radio studios. The mission inspected the offices of the Minister and his top aides housed on two floors of the building and found that they had been damaged by fire. However, the fire has not affected the rest of the building, and the structure as a whole is sound. Visiting the radio studios, the mission found that there was evidence of most equipment having been removed and of vandalism and ransacking.

508. Television broadcasting has been particularly affected by looting and vandalism. The Mutla transmitting station, together with an earlier-built neighbouring back-up station, has been completely destroyed.

509. At Faylakah, the mission found that the old and new buildings have also been destroyed. It was also informed that much of the equipment has been dismantled and removed. The main transmission tower has been damaged in several places.

510. At the television studios housed in the Ministry complex, the mission saw evidence of most of the equipment having been removed, while that which remains has been damaged. A visit to the television video libraries revealed that, apart from a few large reels of documentary films, all of the 45,000 video tapes consisting of Arabic and non-Arabic programmes that the library was said to have contained have been removed. The Ministry of Information has assessed the total cost of rehabilitation and replacement of equipment of radio and television facilities, including the cost of engineering services, at KD 188 million. However, in the view of the mission, a figure of approximately $500 million is considered reasonable to cover the costs of damages and losses sustained by the information sector as a whole.

511. The functioning of the Kuwaiti press has been completely disrupted. Printing presses have been removed or damaged to the point of being unusable. The few Kuwaiti newspapers available at the time of the mission were being printed out of the country.

C. Illustrations

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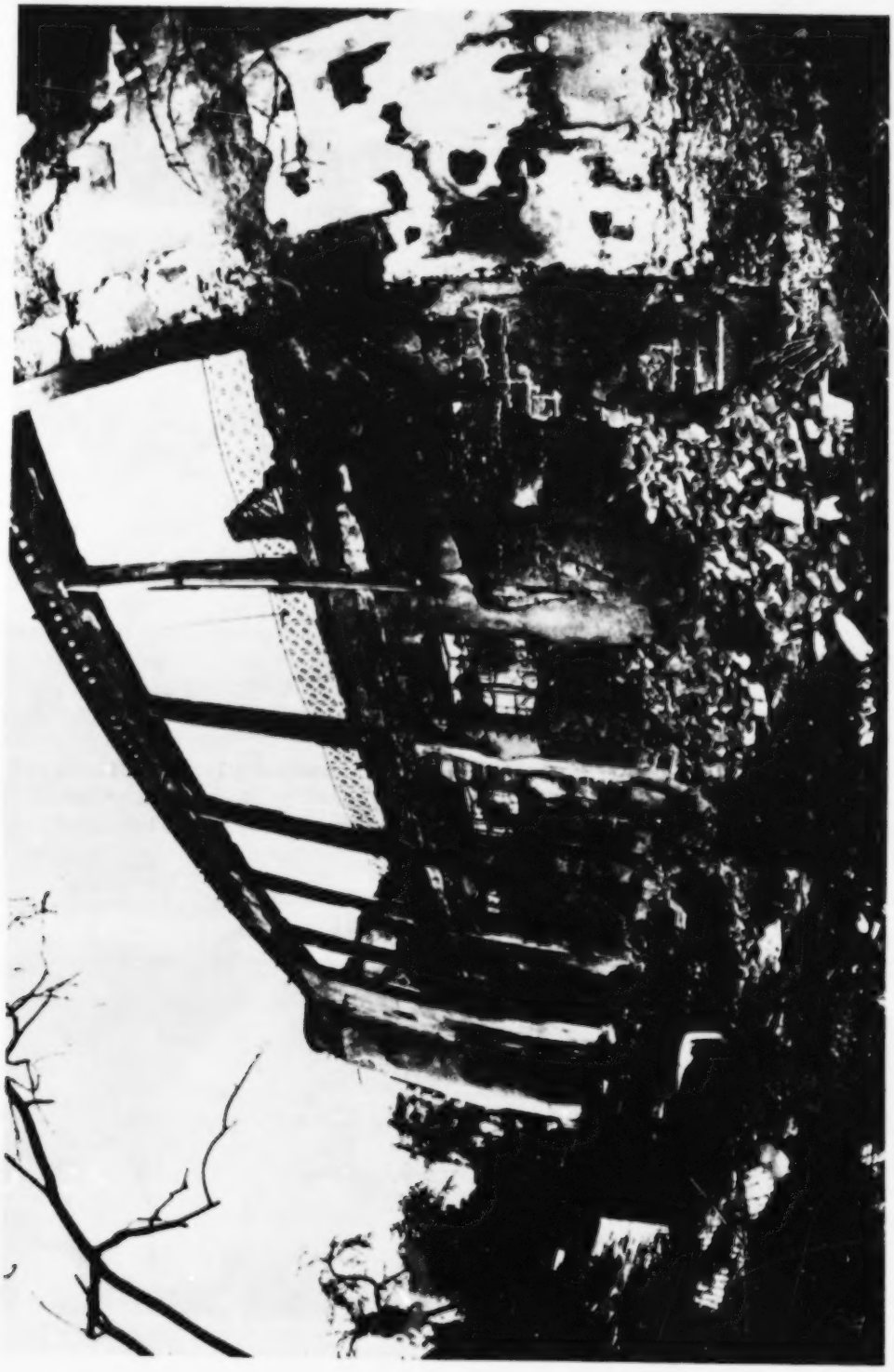
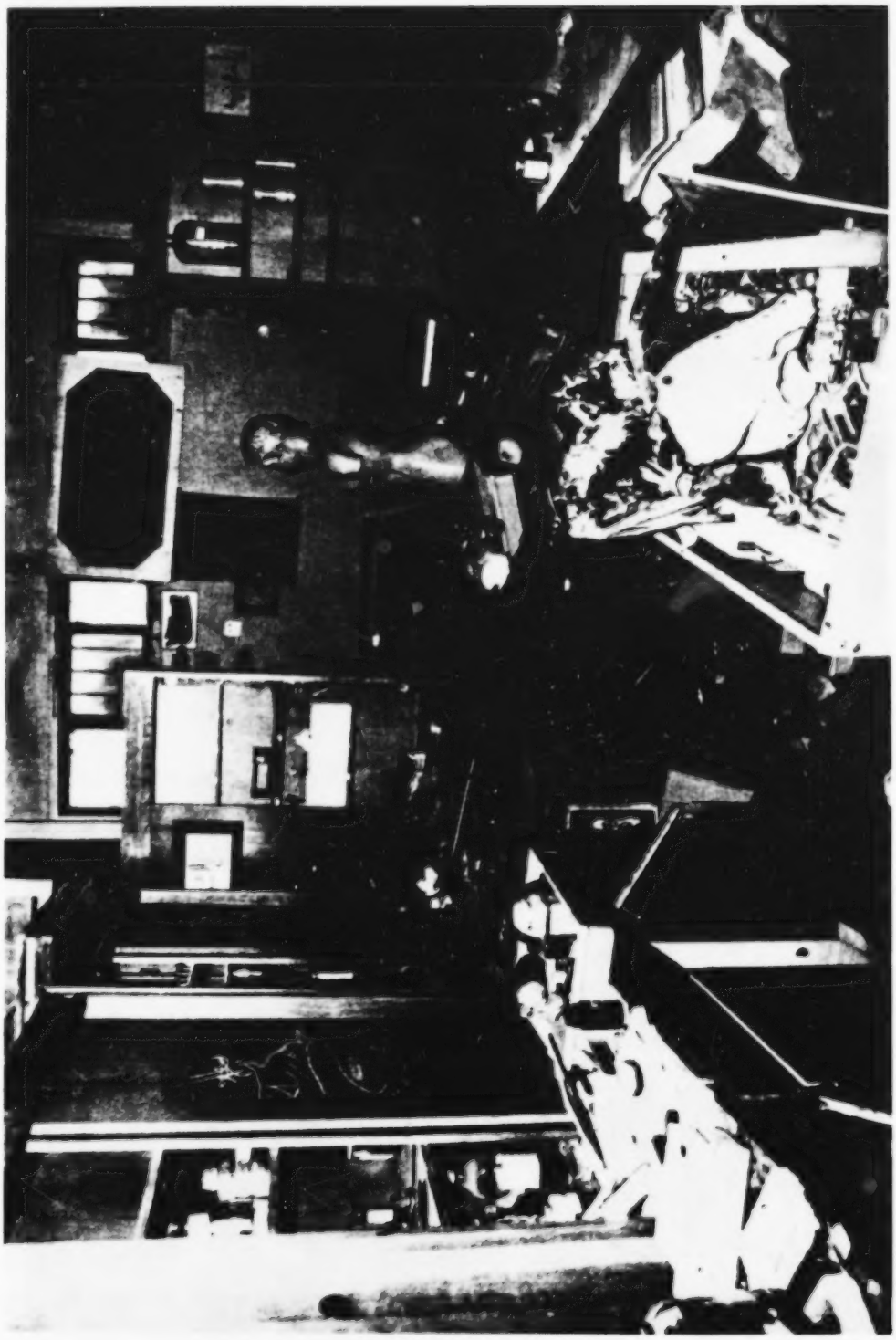
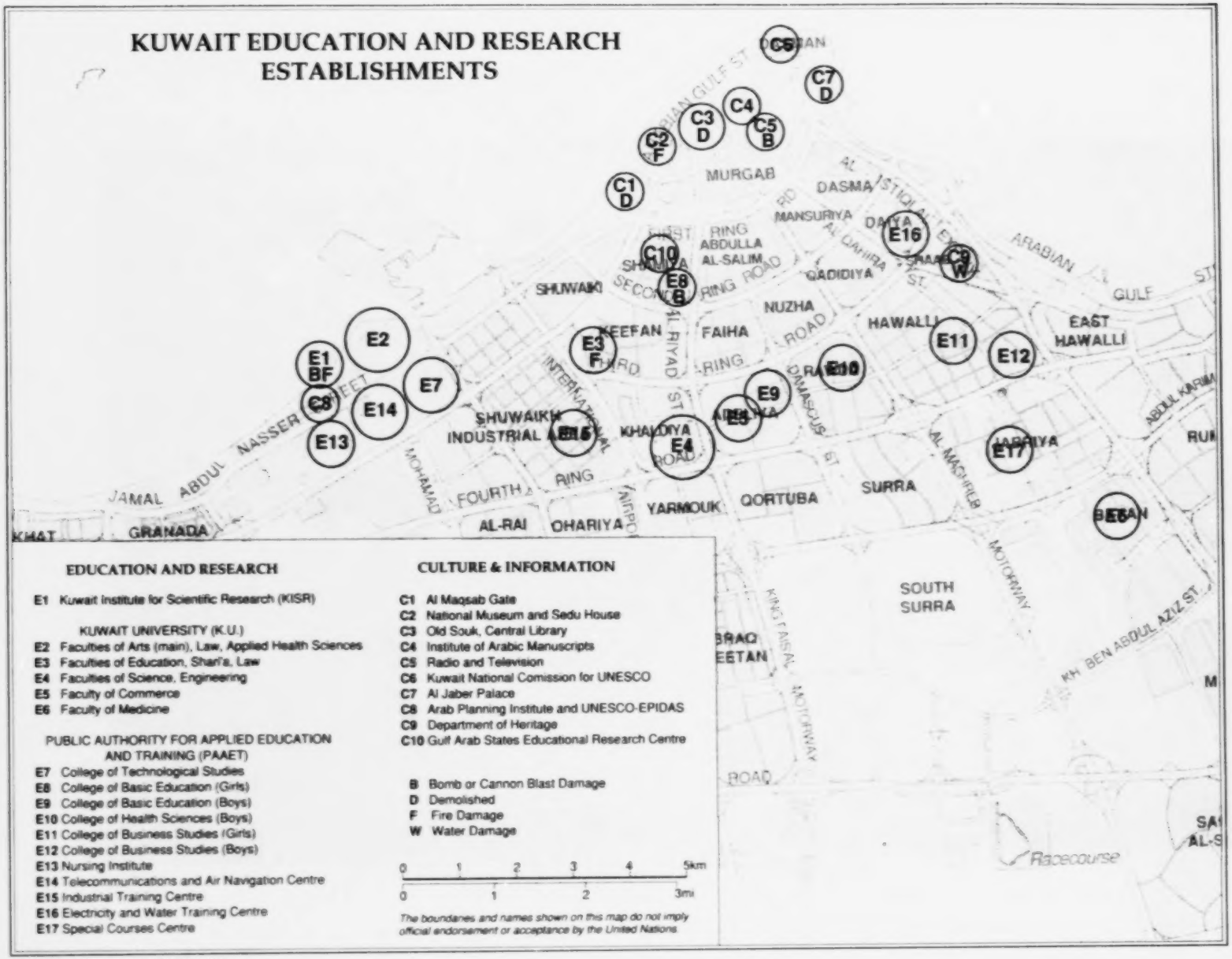
1. Historic building of the old Museum of Kuwait destroyed by the occupation forces 133

2. A classroom destroyed by the occupation forces 134

3. One of the many ransacked school libraries 135







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IX. OTHER ECONOMIC ACTIVITIES: BANKING, COMMERCE AND MANUFACTURING

A. Banking

1. Situation before 2 August 1990

512. The banking sector in Kuwait in mid-1990 covered a modern network of financial activities, domestic and international. The quantity of money amounted to close to KD 1 billion, of which about KD 400 million was currency in circulation outside banks. Total assets of commercial banks amounted to more than KD 10 billion. The Central Bank formulated monetary policy and, to a large degree, regulated banking activities. Its gold reserves amounted to 2,539,000 fine troy ounces, of which about half were in its vault at the time of the occupation.

2. Assessment of damage

513. During the occupation, many banks, including local branches, continued to function as ordered by occupation authorities. However, their activities were vastly reduced. Foreign operations virtually ceased and domestic ones were severely hampered by shrinking output in all economic activities. The system was further disrupted by an early imposition by the occupation forces of the exclusive use of the Iraqi dinar in all transactions, decreeing an exchange rate of 1:1 between the two currencies. (In July 1990, the unofficial exchange rate or "market rate" had been about 10 to 12 Iraqi dinars to a Kuwaiti dinar.)

514. The mission inspected the Central Bank for damage and made a cursory examination of main banks and a large number of local branches. The buildings, in most cases, are virtually undamaged. There has been, however, looting of equipment and, often, loss of important financial information. An important loss for the system, affecting virtually every bank though not in the same degree, has been the illegal seizure of currency and financial assets. To do this, it was often necessary to break into or remove the safe vaults, which often also contained valuable private property. The large volume of financial assets outside the country was little affected as the immediate freeze imposed on these assets by the international community prevented occupation authorities from getting hold of them.

515. The mission visited the Central Bank. Its structure and furnishings were not damaged. The mission was informed that 3,216 gold ingots with a total weight of 1.298 million troy ounces had been removed, together with 6,330 commemorative gold coins, 27,995 commemorative silver coins and many gold and silver medals. Moreover, commercial paper in the amount of KD 147 million was stolen. The currency taken from the Central Bank, according to authorities, amounted to KD 350 million, of which a fifth had been put into circulation. The rest was in new bills.

516. It will take some time for the system to resume normal functioning. Meanwhile, the Kuwaiti Government has issued bank notes with a new colour scheme to avoid disruption because of the large amount of bills that were not in circulation and were taken by occupation forces. Some banks have started operations.

B. Commerce

1. Situation before 2 August 1990

517. Kuwait was a thriving commercial centre in mid-1990. Not only had Kuwait City become an important area for domestic trade, but it was gradually becoming a significant regional trade centre in the Gulf area. Wholesale and retail trade represented about 8 per cent of GDP and absorbed 10 per cent of those employed.

2. Assessment of damage

518. Virtually all commercial complexes of the country have been plundered. Wherever there were concentrations of retail businesses or establishments, a great number of them, if not all, have been looted.

519. The mission's inspection of the commercial complex immediately north of Al Safat Square in Kuwait City revealed extensive pillage. In an area of about 100,000 square metres, close to 800 business concerns and stores, as well as the extensive gold and jewellery markets, were totally plundered. Most of these establishments were of a size between 8 to 24 square metres and were located in concrete buildings. Metal doors, screens and windows had been broken down, and store counters and shelves torn out and emptied. In many cases, fire had gutted the building and caused major structural damage.

520. Other commercial areas examined by the mission in six different towns - Abu-Halifa, Al Ahmadi, Fahaheel, Jahrah, Rega and Subahiza - show a similar pattern. In Jahrah, which had a population of over 120,000, the commercial centre suffered heavy losses. Over 200 businesses were sacked. Although structural damage was very slight, many stores were gutted. The loss of inventories and often of furnishings was virtually total. In Al Ahmadi, a town south of the capital with about 30,000 people, 80 small shops and a medium-sized supermarket suffered extensive damage through looting and vandalism. The same is true for a large number of smaller commercial centres with half a dozen or more shops each in villages along the coast.

521. Many warehouses inspected by the mission in the industrial area of Kuwait City along the Fourth Ring Road, which stored goods such as electronics, spare parts, construction materials and foodstuffs, were ransacked and emptied by the occupation forces. There is every indication that the same happened to warehouses and stockyards in other locations. This was partly confirmed by

aerial survey and select visits on the ground. Automobile dealers were also severely affected. Vehicles - particularly new or expensive ones - were removed from showrooms and dealer premises while many others were stripped of their parts.

522. For numerous large-, medium- and small-sized commercial firms, losses amount to 50 to 100 per cent of the merchandise stored there on 1 August 1990. The total value of the merchandise removed from shops, stores, stockyards and warehouses was reported to exceed $100 million.

523. The revival of commercial activities can only be gradual and will undoubtedly take a long time. Records of purchases on credit have been lost. A large number of debtors remain out of the country. Funds will be required for refurbishing shops, repairing warehouses and rebuilding and it will take time to re-establish the trader-customer relationship current before the occupation.

C. Manufacturing

1. Situation before 2 August 1990

524. Although its relative importance was dwarfed by the size of the oil industry, the manufacturing sector in Kuwait was an expanding, vibrant activity in mid-1990. The diversification strategy of the Government had encouraged numerous investors and, in the 1980s many new lines of activity came into operation. Manufacturing had entered a new phase with large investments, modern machinery and management and the quest for new markets, particularly the Gulf area and the rest of the Middle East. Excluding oil refining, about 8 per cent of the labour force was engaged in manufacturing. By early 1990 there were more than 4,000 manufacturing establishments, mostly in the textile, construction and food and beverage industries. Annual exports (excluding the petro-chemical industry) exceeded $500 million at the time of the invasion. There were four principal industrial centres located at Shuaiba, Shuwaikh, Subhan and Swaibiya - where the majority of the medium-size and large-size enterprises were located.

2. Assessment of damage

525. The occupation of the country produced a major disruption in the manufacturing sector. In the first weeks of the occupation and progressively thereafter considerable quantities of modern machinery and equipment, particularly those brought for newly constructed factories, were dismantled and removed by truck to Iraq. State-of-the-art plants, large and small, were the primary target of this systematic looting of capital assets which was often accompanied by removal of inventories of raw materials, spare parts and finished goods. This planned acquisition of booty was accompanied by smaller-scale, but widespread, pillage by Iraqi troops.

526. The mission visited the four major industrial centres and inspected 24 manufacturing plants ranging in size from 1,500 to 30,000 square metres. Time constraints did not allow for a more detailed examination or a wider sampling and the assessment by the mission cannot claim to be definitive. However, even a surface examination of other plants in these centres, together with an aerial inspection of rural agro-industries, indicated that very few had escaped damage or suffered only minor loss. It was not possible for the mission to attempt a detailed quantification of damage at each plant visited since the majority of them belonged to the private sector and most owners had fled the country.

527. Ransacking and, in most cases, vandalism were evident in offices in the 24 plants inspected. Equipment had been removed, safety vaults forced open and contents purloined, cabinet files raided and documents scattered and torn. Furniture had generally been smashed or strewn in corridors and yards.

528. In 11 small plants there was moderate-to-heavy equipment loss although damage to the structures was in general very light. There were two cases of more serious damage: a fibreglass boat construction plant and a filter producing factory, where explosives had caused roofs to sink and steel supports to collapse. Inventory loss of raw materials and spare parts and finished products ranged from marginal to complete loss. One spark-plug factory was a complete write-off.

529. Structural damage was light in medium-sized plants with the exception of a fishing company whose main building was severely affected by explosives and fire. Loss of equipment can be qualified as heavy on the average as can that of inventories. Among the seven large-sized plants inspected major structural damage was evident in the building of a dairy company that will have to be largely rebuilt. In the others damage was slight to moderate. Removal of machinery and looting of equipment together with losses in inventory was severe. Spare parts and raw materials suffered greater depletion than finished products.

530. As has been stated, a detailed quantification is not possible but overall losses in the sector have been considerable. In the absence of supporting data an assessment can be made only once the owners return. The loss has not been confined to that of theft and damage of equipment, removal of inventory and ransacking of offices. The staggering loss of output must also be taken into account since production in a considerable number of the large factories came to a halt immediately after the invasion of the country.

531. Resumption of most of these activities will take considerable time. Each place presents a particular problem, in some cases many problems combined. Ordnance has to be cleared; electricity and water have to be restored; buildings and structures have to be rebuilt and equipment has to be replaced. Repairs would need to be extensive. Even if immediate funds are found to order equipment, their delivery will take time. Raw materials and spares will have to be replenished. And the technical staff to operate the plants will have to be found.

D. Illustrations

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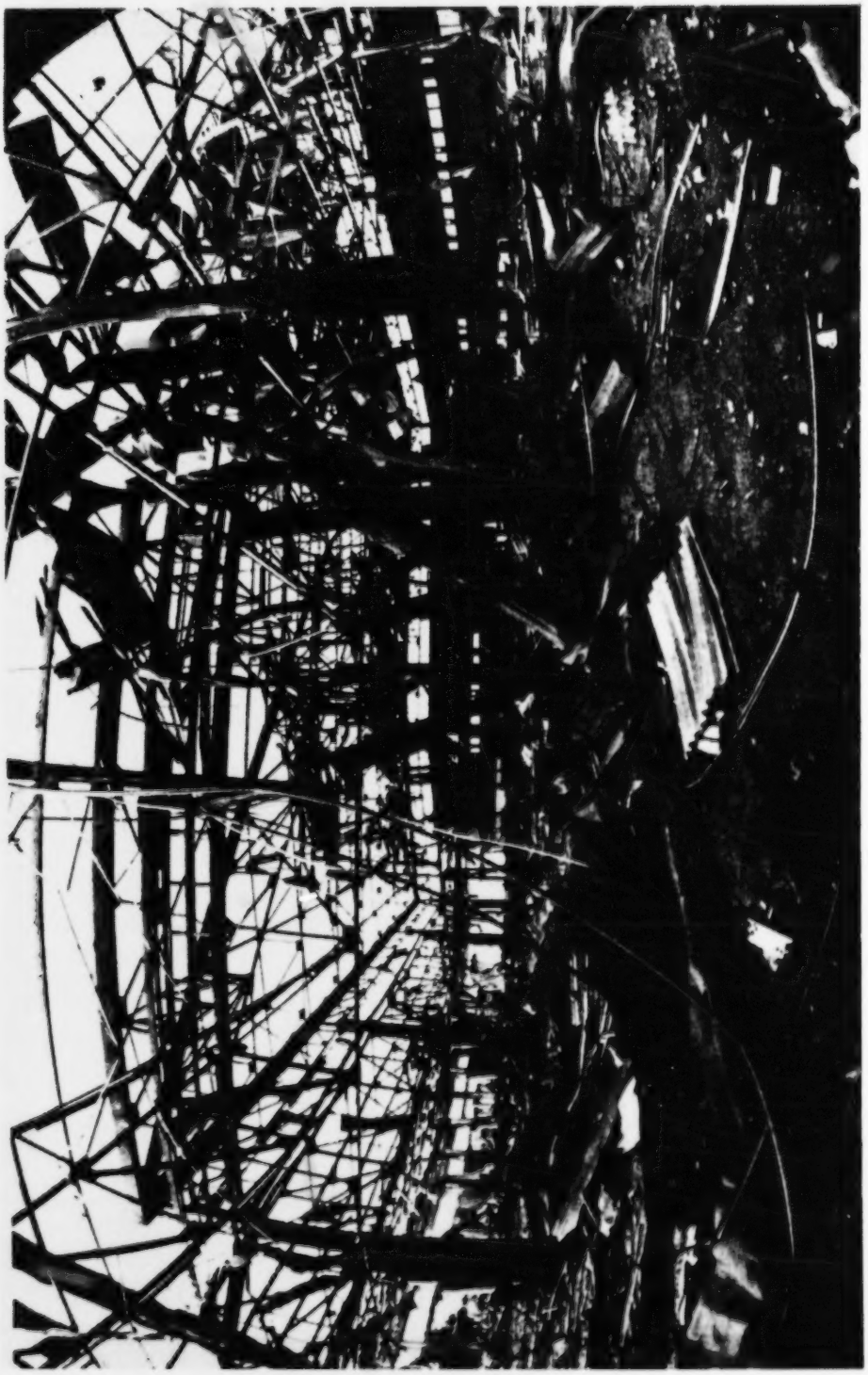
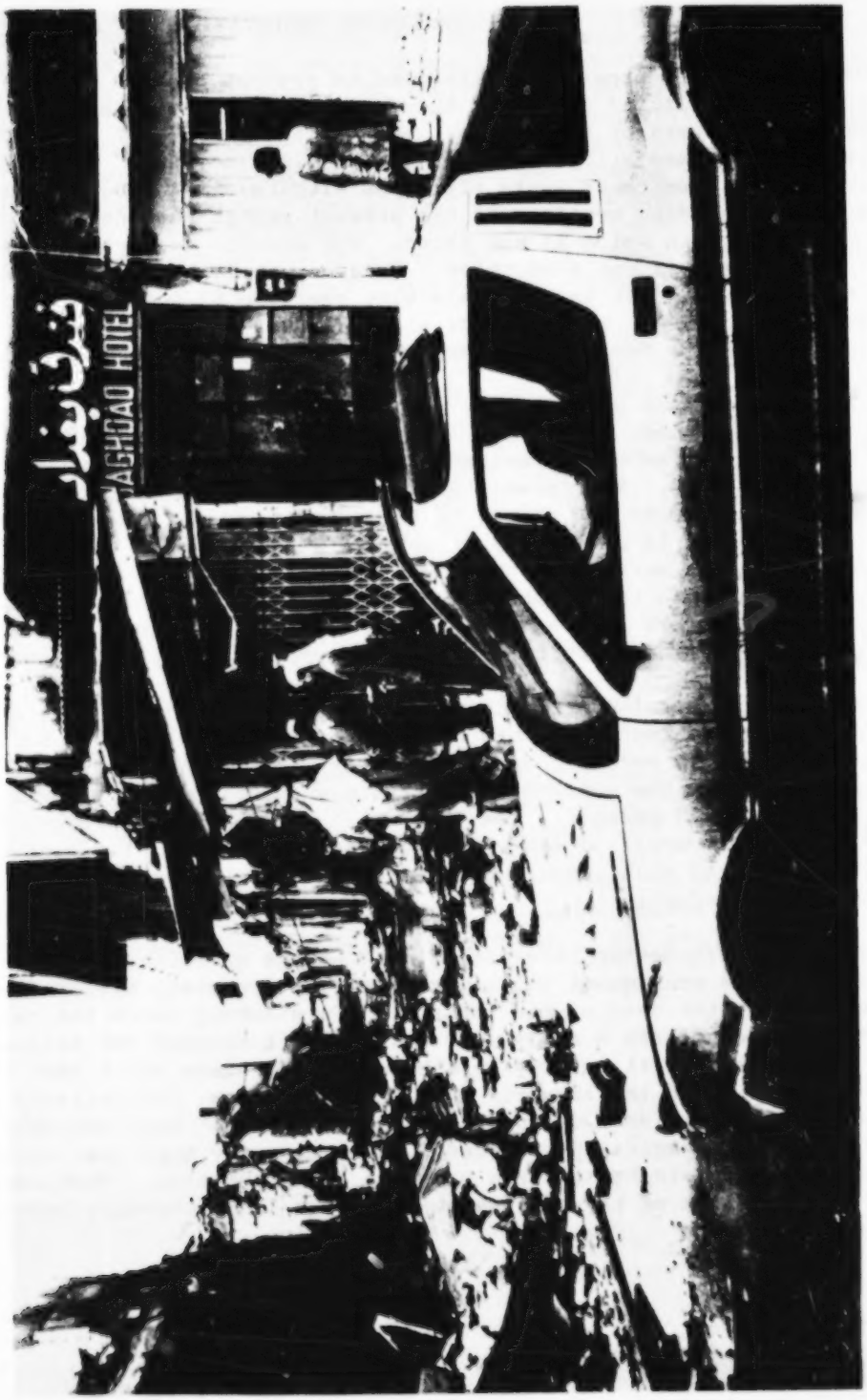
1. One of the three pavilions of the Kuwait International Trade Fair, covering an area of 34,000 square metres, that were totally destroyed 142

2. Part of the devastated commercial district in Kuwait 143

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X. CONCLUDING OBSERVATIONS

532. The present report has attempted to present a broad assessment of damage and losses inflicted on Kuwait based primarily on personal inspection and survey by members of the mission, and, in the absence of relevant records and data, on oral and written information provided to them. The mission reached Kuwait less than three weeks after the withdrawal of Iraq's occupation forces. Preceding sections of the present report have detailed the constraints with which it was faced. The mission is aware of the fact that its assessment is not exhaustive. However, it is hoped that its broad findings, arrived at through selective sampling in some sectors and random sampling in others, will provide a representative illustration of the nature and scope of the damage inflicted upon the economy of Kuwait.

533. Today, Kuwait struggles to recover from the consequences of its occupation by Iraq, which have left no section of its population or sector of its economy untouched. Innocent lives have been lost and suffering caused to countless others. The damage inflicted on the economy almost seems incalculable. Over two thirds of the Kuwaiti population was obliged to flee the country and is now widely dispersed, while nearly a million foreign technicians and workers who were the mainstay of the service sector have been forced to abandon their jobs and return to their countries. The oil industry, which is the nerve centre of the economy, is in shambles, while other vital sectors of the infrastructure have been systematically sabotaged and plundered.

534. When the mission arrived in Kuwait, public utilities were not functioning and basic social services were non-existent. The awesome dimensions of the damage inflicted on the country, together with the efforts needed to repair and reconstruct the wrecked infrastructure, had imparted a feeling of helplessness and despair. The Government and people were faced with a situation of compelling and yet competing priorities. The most visible, and undoubtedly the most significant, of the sectors affected by the occupation was the oil industry.

535. The unprecedented catastrophe of hundreds of burning and gushing oil wells and the consequent pollution of the environment, overshadows the damage sustained by the rest of the industry. In monetary terms the current situation represents a daily loss to Kuwait of between $40 million and as much as $120 million. It is only by the capping of these wells that it would be possible to bring the industry back into operation, particularly since the country's refineries and export facilities have not been entirely destroyed but rather strategically crippled. There is every hope that within two months local demand could be met from domestic oil production. What remains unknown is the condition of the oil reservoirs which it is strongly feared have been damaged.

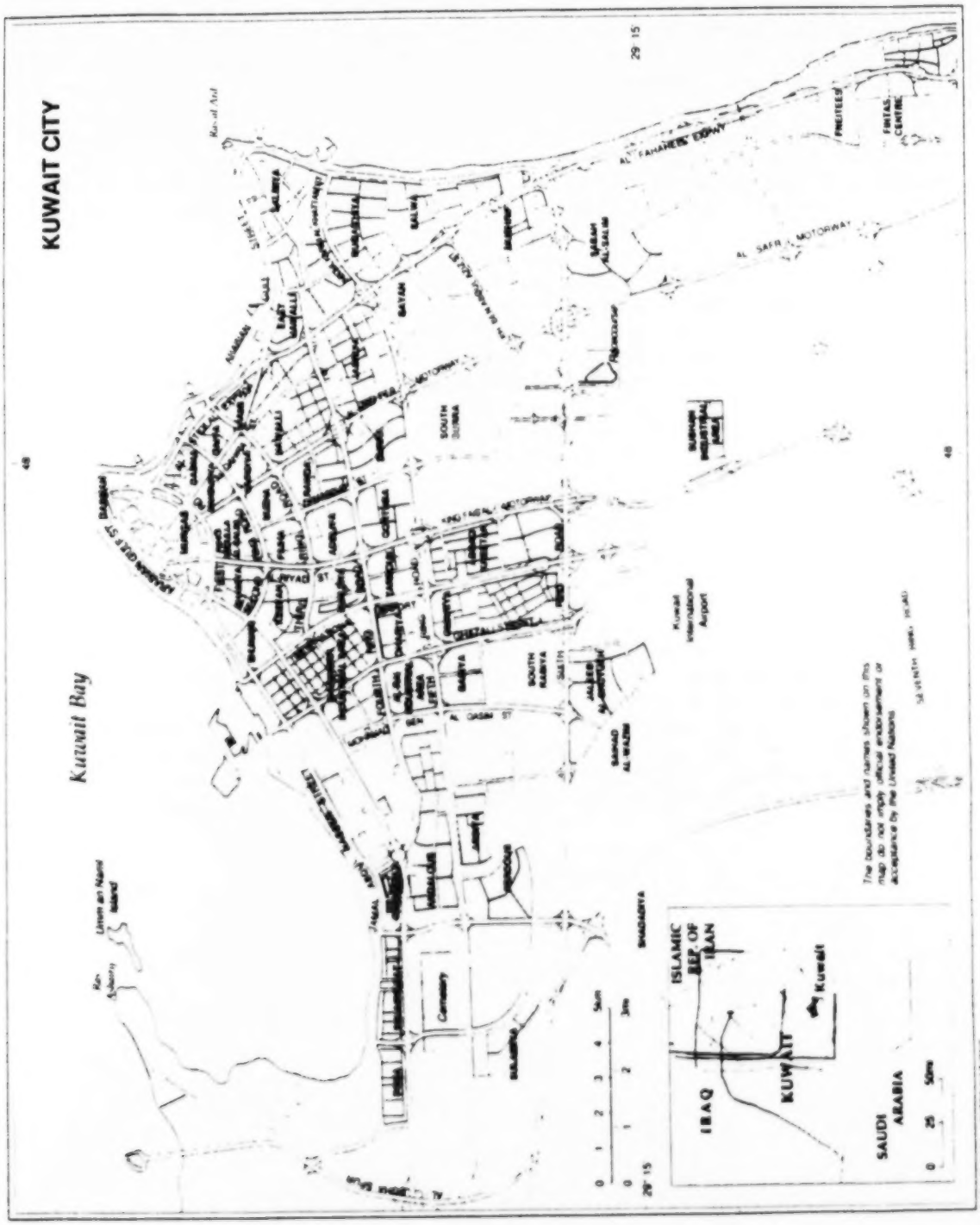
536. At the time of the mission's departure from Kuwait and six weeks after the start of the oil fires, no one was in a position to define with certainty the composition of the fire emissions. No one can be complacent over the hundreds of burning oil wells that continue to scar the countryside, emitting dense black clouds of smoke that hover ominously over Kuwait - clouds that frequently blot out the sun turning day into night and causing abnormally sharp drops in temperature. This would point to a serious gap in response mechanisms. It has precluded the mission from saying very much about the resulting effect on human health and on ecosystems. To remedy this it would appear vitally necessary to establish an international emergency response service.

537. The oil-fire problem in Kuwait has also highlighted the need to consider environmental problems in the Gulf on a regional basis. The smoke plumes from the fires have cast their pall over many other Gulf States. Likewise, oil-slicks originating in one country may move through the Gulf and affect the waters and coastlines of neighbouring countries. There is a need for cooperation in data and information exchange as well as in remedial management actions. The role of regional organizations such as the Regional Organization for the Protection of the Marine Environment cannot be overstressed.

538. Certainly, the most lasting environmental problem facing Kuwait will be that of mines and other unexploded ordnance. It will hit at the social behavioural patterns of all residents of Kuwait as well as the nomadic people who seasonally move across Kuwait's borders. The danger posed to life will continue for a long time to come.

539. Education has suffered across the board. A generation of children and youth have lost at least one school year and virtually every educational facility, public and private, has been ransacked, defiled and partly destroyed. The country has been robbed of its intellectual base. Printed material can be replaced, but not the unpublished materials, lecture notes, correspondence with other researchers and computer databases. As one professor commented, "We are left with nothing except that which is stored in our heads."

Map 14


KUWAIT CITY
Kuwait Bay
AL FAHAHEEL EXPWY
AL SAFR MOTORWAY
Kuwait International Airport
ISLAMIC REP. OF IRAN
IRAQ
KUWAIT
SAUDI ARABIA
Kuwait
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